

## APPENDIX B. Directory of OSS E/PO Programs

This directory provides overview information on the overall Education and Public Outreach (E/PO) program activities of each Office of Space Science (OSS) mission or program. Each listing contains the following information:

**Title:**

Title of the mission or program.

**Description:**

Overview description of the E/PO activities conducted by the mission or program.

**Lead:**

Person or organization with lead E/PO responsibility for the mission or program.

**Contact:**

Person or organization with contact E/PO responsibility for the mission or program.

**URL:**

Web address for further information on the mission's or program's E/PO activities.

**Activities (or Grants):**

Indexed listing of all E/PO products and activities conducted or supported by the mission or program (or of all active E/PO grants supported by the program).

The listings are grouped into categories as follows:

**Office of Space Science**

Grants Programs  
Major Partnerships

**Education and Public Outreach (E/PO) Support Network**

Forums  
Broker/Facilitators

**Astronomical Search for Origins (ASO) Missions**

Major Missions  
Explorers  
Navigator  
Other NASA Programs

**Solar System Exploration (SSE) Missions**

Major Missions  
Discovery  
Mars Exploration Program  
Outer Planets Program  
Other NASA Programs  
International Missions with NASA Participation

**Structure and Evolution of the Universe (SEU)**

**Missions**

Major Missions  
Explorers  
Attached Payloads  
Other NASA Programs  
International Missions with NASA Participation

**Sun-Earth Connection (SEC) Missions**

Major Missions  
Explorers  
International Solar-Terrestrial Physics (ISTP)  
Solar-Terrestrial Probes (STP)  
Other NASA Programs  
International Missions with NASA Participation

## OFFICE OF SPACE SCIENCE

### Grants Programs

#### B1. Initiative to Develop Education through Astronomy and Space Science (IDEAS)

**Description:** The IDEAS Grant Program is one component of the NASA Office of Space Science (OSS) education and public outreach (E/PO) strategy. It is administered by the Space Telescope Science Institute (STScI) on behalf of NASA OSS. As part of the overall OSS E/PO program, the IDEAS Grant Program provides start-up funding for innovative, creative education and public outreach projects that feature active collaboration between astronomers/space scientists and formal/informal education professionals. Through this effort, the IDEAS objective is to enhance science, mathematics, and/or technology education in the United States for K-14 students, teachers, and the general public by promoting partnerships that explore new ways to translate astronomy and space science into contexts that will educate and stimulate the interest of students, teachers, and the general public. The reporting programs have completed their projects which span multiple years. Thirteen new proposals were selected for funding in FY 2002.

**Contact:** Ms. Heather Bradbury, Space Telescope Science Institute, Formal Education Division, 3700 San Martin Drive, Baltimore, MD 21218.

E-mail: [hbradbur@stsci.edu](mailto:hbradbur@stsci.edu). Phone: 410-338-4968.

**URL:** <http://ideas.stsci.edu/>

**Grant(s):** A Multi-Wavelength International Exploration of the Universe [A247]  
Acknowledging Under-Resourced Outer Reaches of Alaska (AURORA) [A248]  
Astronomy Foundations Through Art and Paper Plates (AFTAPP)—Serving the Universe on a Paper Plate [A68]  
Connections: Image Processing, Mars, and Science [A149]  
Did You See the Moon Last Night? [A154]  
Institute of Astronomy for Elementary Science Teachers [A174]  
Project REACH for the Stars [A196]  
Project SEARCH [A197]  
Project SPARK—Student Program for Aeronautics Resources and Knowledge (SPARK) [A288]  
Space Science Education at the University of Wisconsin [A294]  
Teacher Training to Enhance Space Science Curriculum [A242]  
The Dynamic Sun Planetarium Project [A4]

#### B2. Minority Institution Initiative (MI Initiative)

**Description:** The Office of Space Science (OSS) and the Office of Equal Opportunity Programs Minority University Education and Research Partnership Initiative in Space Science is a grant program with the long-term goals of enhancing minority college and university participation in space science and increasing the understanding of science, technology, and the role of research in contemporary society in a broad and diverse segment of the American population. It emphasizes partnerships among OSS, the space science research community, and Minority Institutions. During FY 2002, 15 projects were funded under this initiative, including 6 at Historically Black Colleges or Universities, 3 at Hispanic Serving Institutions, 3 at Tribal Colleges, and 3 at other Minority Institutions. Collectively, they were engaged in research collaborations with 9 NASA space science missions or suborbital projects and in more than 30 working partnerships with major space science research groups. In academic programs, they established on their campuses 22 new or redirected space science faculty positions, 11 new or revised space science degree programs, and 66 new or revised space science courses. They also engaged in a wide variety of teacher training, precollege outreach, and public outreach programs that serve constituencies in their local communities.

**Lead** Dr. Philip Sakimoto, NASA Office of Space Science, Code S, Washington, DC 20546.

E-mail: [phil.sakimoto@hq.nasa.gov](mailto:phil.sakimoto@hq.nasa.gov). Phone: 202-358-0949.

**Grant(s):** A Space Science Curriculum at Hampton University: Development of a Minor, Faculty Enhancement, and K-14 Outreach [A32]  
An Urban Outreach Program in Space Science: A Collaborative Effort Among NASA, Hispanic-Serving and Black Universities, and School Age Minority Students [A33]  
Astronomy and Astrophysics Course Development at Salish Kootenai College [A34]  
Collision Processes in Astrophysical Plasmas [A35]  
Connecting Sun City with Sun-Earth Connections [A36]  
Enhancement of the Space Science Research Program at South Carolina State University [A37]

NASA-HBCU Partnership To Enhance Minority Education and Research Participation in the Space Sciences [A38]  
 New Opportunities Through Minority Initiatives in Space Science [A39]  
 New York City Space Science Research Alliance [A40]  
 Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]  
 Scientists Mentoring Astronomy Research Teams of Tomorrow (SMARTT) [A42]  
 Southwest Internet Program for the Enhancement of Minority Education [A43]  
 Space Science Education and Sun-Earth Connection [A44]  
 Stars on Earth: Providing Underrepresented New Mexico High School Students with Research Experience in Space Science and Preparation for Math, Science, and Technology [A45]  
 York College Observatory Educational Outreach Program (YCOOP) [A46]

### B3. Supporting Research and Technology (SRT)

**Description:** The NASA Office of Space Science (OSS) SRT Program provides grants for basic research and instrument development and data analysis for OSS missions. Each grantee also has the opportunity to propose a supplementary education and public outreach (E/PO) project to be conducted in conjunction with the research project. The outcomes of the funded E/PO projects are reported here.

**Contact:** Dr. Larry Cooper, NASA Office of Space Science, Code S, Washington, DC 20546.  
 E-mail: [Larry.P.Cooper@nasa.gov](mailto:Larry.P.Cooper@nasa.gov). Phone: 202-358-1531.

**URL:** <http://spacescience.nasa.gov/education/scientists/index.html>

**Grant(s):** A Space Science Module for Los Alamos Space Science Outreach (LASSO) [A138]  
 A Tale of Two Deserts: Training Educators to Understand Water-Formed Features in the Desert Southwest and on Mars Using Image-Based Exercises [A139]  
 Astromaterials-Astrobiology Student Presentations [A257]  
 Heliosat Spectroscopy [A18]  
 Lesson Plan Development: Convection, Spectroscopy, and Velocity and Acceleration [A234]  
 NASA-HBCU Partnership To Enhance Minority Education and Research Participation in the Space Sciences [A38]  
 Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Regional Planetary Image Facility (RPIF) Open Houses [A354]  
 Regional Planetary Image Facility (RPIF) Teacher Workshops [A198]  
 Rocks from Space in the Classroom [A238]  
 "Rocks from Space" Teacher Workshops [A199]  
 Science Education Gateway/National Virtual Observatory [A358]  
 Science@NASA [A359]  
 Space Science Education at the University of Wisconsin [A294]  
 Studies of Solar Magnetic Fields and Solar Activity [A377]  
 Windows to the Universe [A245]

### B4. University Research Centers at Minority Institutions (URCs)

**Description:** The URCs at Minority Institutions is an Office of Equal Opportunity Programs (OEOP)-managed program that is intended to achieve a broadly based, competitive aerospace research capability at Historically Black Colleges and Universities (HBCUs) and Other Minority Universities (OMUs) that will 1) expand the Nation's base for aerospace research and development, 2) foster new aerospace science and technology concepts, 3) develop mechanisms for increased participation by faculty and students of HBCUs and OMUs in the research programs of NASA's science and technology Enterprises, and 4) increase the numbers of underrepresented minorities at HBCUs and OMUs who attain advanced degrees in NASA-related fields. Each URC is a multidisciplinary scientific or engineering research center at the host university that contributes to the research program of one or more of the NASA Strategic Enterprises. The Office of Space Science provides funding and technical support to URCs that are working in space science areas.

**Lead:** Dr. Jeffrey Rosendhal, NASA Office of Space Science, Code S, Washington, DC 20546.  
 E-mail: [jeffrey.rosendhal@hq.nasa.gov](mailto:jeffrey.rosendhal@hq.nasa.gov). Phone: 202-358-2470.

**Grant(s):** Center for Automated Space Science [A47]

## Major Partnerships

### B5. Adler Center for Space Science Education (Adler)

**Description:** The Center for Space Science Education at the Adler Planetarium and Astronomy Museum serves as a nexus between the research and education communities. Its goal is to bring a broad program of astronomy and space science education to the half-million annual visitors to the museum and to reach beyond the traditional museum setting to provide educational support for students, teachers, and families.

**Lead:** Dr. Paul Knappenberger, Adler Planetarium and Astronomy Museum, 1300 S. Lake Shore Drive, Chicago, IL 60605.

E-mail: [paul@adlernet.org](mailto:paul@adlernet.org). Phone: 312-322-0325.

**URL:** <http://adlerplanetarium.org>

### B6. Challenger Center for Space Science Education (Challenger Center)

**Description:** The Challenger Center for Space Science Education is a global, not-for-profit education organization. Our mission is to use the excitement of space exploration as a theme to create positive learning experiences that raise students' expectation of success; foster in them a long-term interest in mathematics, science, and technology; and help them develop critical communication, decisionmaking, and team-building skills. Challenger Center works to develop and maintain a scientifically literate world where every individual has a reasonable understanding of science, mathematics, and technology, and the role they play in our lives. During the past 16 years, Challenger Center has proven its commitment to education through a wide variety of innovative educational programs. Each program is designed to help improve math and science scores. Challenger Center employs three astrophysicists who work as both educators and researchers. As researchers, they work part-time focusing on their individual research interests. As educators, they serve as science content reviewers and writers, workshop leaders, featured speakers, and speakers in the classroom and in other venues. Challenger Center's staff scientists reach thousands of educators, students, parents, and members of the general public each year. "Window on the Universe" and "Voyage: A Journey Through Our Solar System" are two of the Challenger Center's education and public outreach programs that are funded in part by NASA's Office of Space Science. "Window on the Universe" is an education initiative that uses the fields of human space flight and the space sciences to engage entire communities in sustained science, mathematics, and technology education. "Voyage" is a permanent, outdoor scale model of our Solar System on The National Mall.

**Lead:** Dr. Jeffrey Goldstein, Challenger Center for Space Science Education, 1250 North Pitt Street, Alexandria, VA 22314.

E-mail: [journey@challenger.org](mailto:journey@challenger.org). Phone: 703-683-9740.

**URL:** <http://www.challenger.org>

**Activities:** Journey through the Universe [A52]

### B7. OSS Outreach Activities (OSS/Outreach)

**Description:** In keeping with our education outreach goal of enhancing the quality of education, the Office of Space Science (OSS) participates in a number of education and outreach activities at both the regional and national levels. OSS supports a number of regional and national education conferences that are attended by thousands of educators in mathematics, science, and technology. OSS supports various professional conferences that are attended by thousands of scientists from all fields of space science. Such activities at these conferences usually entail showcasing an exhibit, distributing educational and outreach material (lithograph sets, posters, educator guides, strategic plans, etc.), conducting educational workshops, giving keynote speeches, highlighting various space science Web pages, and having NASA employees and scientists answer questions about space science. Finally, OSS staff members participate in more localized events such as conducting talks in local classrooms.

**Lead:** Ms. Ruth Netting, NASA Office of Space Science, Code S, Washington, DC 20546.

E-mail: [rnetting@hq.nasa.gov](mailto:rnetting@hq.nasa.gov). Phone: 202-358-0539.

**URL:** <http://spacescience.nasa.gov/education>

**Activities:** Professional Societies of Minority Scientists/OSS Collaboration [A57]  
U.S. Physics Team Tribute [A387]

### B8. OSS Science Center Development (OSS/Sci. Ctr. Dev.)

**Description:** In keeping with our public outreach goal of sharing the excitement of space science discoveries with the public, the Office of Space Science supports a number of major development projects at science centers and

planetariums across the country. Such projects typically entail the development or renovation of exhibit galleries or planetariums, coupled with the development of new exhibits, shows, and education programs that are based on the results of recent NASA space science missions and discoveries. These efforts make a substantial contribution to the general public's understanding of science and to communicating to students and the public the new understanding of the Universe as it has been derived from NASA's space science program.

Lead: Dr. Jeffrey Rosendhal, NASA Office of Space Science, Code S, Washington, DC 20546.  
E-mail: [jeffrey.rosendhal@hq.nasa.gov](mailto:jeffrey.rosendhal@hq.nasa.gov). Phone: 202-358-2470.

Contact: Dr. Philip Sakimoto, NASA Office of Space Science, Code S, Washington, DC 20546.  
E-mail: [phil.sakimoto@hq.nasa.gov](mailto:phil.sakimoto@hq.nasa.gov). Phone: 202-358-0949.

URL: <http://spacescience.nasa.gov/education>

Activities: Museum of Discovery and Science/NASA Space Science Education Partnership [A25]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
South Carolina State Museum Observatory, Planetarium, and Theater Project [A28]

### **B9. Passport to Knowledge (P2K)**

Description: P2K is a series of interactive learning adventures that connect essential life, Earth, space, and physical science concepts with exciting real-world phenomena. P2K uses a powerful, integrated suite of video programs, hands-on activities, and online resources to deliver real science, real scientists, real locations, and real learning, while students experience some of the most exciting and challenging places on Earth and beyond.

Lead: Mr. Geoffrey Haines-Stiles, Geoff Haines-Stiles Productions, 27 Washington Valley Road, Morristown, NJ 07960.  
E-mail: [ghs@passporttoknowledge.com](mailto:ghs@passporttoknowledge.com). Phone: 973-656-9403.

URL: <http://passporttoknowledge.com>

Activities: "Live from Mars 2001" and "Live from Mars 2002" [A270]  
"Live from the Aurora" [A271]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]

### **B10. Students Training for Achievement in Research Based on Analytical Space Science Experiences (STARBASE)**

Description: STARBASE is a combination of dedicated hardware, professional astronomers, teachers, and students who are working together in scientific investigations and education. The purpose is to involve motivated high school and college students as direct and integral participants in the research of space scientists. The initial efforts are centered on developing the first two nodes in a network of longitudinally spaced, meter-class, CCD-imaging telescopes that can be operated remotely or robotically over the Internet or operated locally for training and research. A 0.6-meter telescope at Western Kentucky University and the 1.3-meter Remotely Controlled Telescope (RCT) at Kitt Peak National Observatory are being refurbished and automated. A network of universities that share common interests in research and education is being developed, and more than a dozen undergraduate students are currently involved in developing various aspects of STARBASE.

Lead: Dr. Charles McGruder, Western Kentucky University, Department of Physics and Astronomy, Bowling Green, KY 42101.  
E-mail: [charles.mcgruder@wku.edu](mailto:charles.mcgruder@wku.edu). Phone: 270-745-4357.

Activities: Hands-On Universe Workshop [A268]  
Public Education in Astronomy [A352]  
STARBASE Teachers and Students [A295]

## **EDUCATION AND PUBLIC OUTREACH (E/PO) SUPPORT NETWORK**

### **Forums**

#### **B11. Astronomical Search for Origins Forum (ASO Forum)**

Description: The Origins program is the scientific study of the long chain of events, from the birth of the Universe in the Big Bang through the formation of galaxies, stars and planets, and the chemical elements of life to the profusion of life on Earth and possibly elsewhere. The overarching program, funded by NASA, that enables researchers to pursue these questions is called the Astronomical Search for Origins and Planetary Systems, or Origins for



short. The Forum is the public gateway to the research results, the data, the information, and the people behind this quest.

Lead: Dr. Ian Griffin, Space Telescope Science Institute, Office of Public Outreach, 3700 San Martin Drive, Baltimore, MD 21218.

E-mail: [griffin@stsci.edu](mailto:griffin@stsci.edu). Phone: 410-338-4567.

URL: <http://origins.stsci.edu/>

Activities: Exceptional Space Science Materials for Exceptional Students [A158]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Origins Presentations and Workshops [A192]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Science@NASA [A359]

## **B12. Solar System Exploration Forum (SSE Forum)**

Description: The Office of Space Science Solar System Exploration Education and Public Outreach Forum serves as the entry point and coordinator for education and outreach activities and materials for NASA's Solar System exploration missions and research activities. Our content includes the planets beyond Earth, comets, asteroids, other planetary bodies, and moons.

Lead: Ms. Leslie Lowes, NASA Jet Propulsion Laboratory, Mail Stop 180-109, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Leslie.L.Lowes@jpl.nasa.gov](mailto:Leslie.L.Lowes@jpl.nasa.gov). Phone: 818-393-7734.

Contact: Dr. Ellis Miner, NASA Jet Propulsion Laboratory, Mail Stop 230-260, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Ellis.D.Miner@jpl.nasa.gov](mailto:Ellis.D.Miner@jpl.nasa.gov). Phone: 818-354-4450.

URL: <http://sseforum.jpl.nasa.gov>

Activities: AAS Division of Planetary Sciences Activities [A394]  
 Exceptional Space Science Materials for Exceptional Students [A158]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 "MarsQuest" Planetarium Show [A2]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Practical Uses of Math and Science (PUMAS) [A237]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Science Education Standards Matrix (Quilt) Outreach [A240]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Space Science Workshops for Educators [A210]  
 Summer Solstice Celebration [A378]

## **B13. Structure and Evolution of the Universe Forum (SEU Forum)**

Description: The SEU Education Forum shares the exciting discoveries and knowledge from NASA SEU missions and research programs with educators, students, and the general public. The SEU partnership brings together the rich expertise of scientists, science educators, and education researchers to develop innovative products and programs. Our goal is to contribute to the improvement of precollege science education and increase science literacy at all levels, focusing attention on the human quest to understand the Universe and our place in the cosmos.

Lead: Dr. Roy Gould, Harvard-Smithsonian Center for Astrophysics, Mail Stop 71, 60 Garden Street, Cambridge, MA 02138.

E-mail: [rgould@cfa.harvard.edu](mailto:rgould@cfa.harvard.edu). Phone: 617-496-7689.

Contact: Ms. Mary Dussault, Harvard-Smithsonian Center for Astrophysics, Mail Stop 71, 60 Garden Street, Cambridge, MA 02138.

E-mail: [mdussault@cfa.harvard.edu](mailto:mdussault@cfa.harvard.edu). Phone: 617-496-7962.

URL: <http://cfa-www.harvard.edu/seuforum/>

Activities: Authors' Nights at the Harvard-Smithsonian Center for Astrophysics (CfA) [A311]  
 Chandra X-Ray Center Teacher Workshops and Presentations [A148]  
 Children's Nights at the Harvard-Smithsonian Center for Astrophysics [A321]  
 "Cosmic Questions" Informal Science Education Programs [A14]  
 "Cosmic Questions" Interpretation/Docent Activities [A15]  
 "Cosmic Questions" Professional Development for Classroom Educators [A151]  
 "Cosmic Questions" Professional Development for Informal Science Educators [A16]  
 "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
 Exceptional Space Science Materials for Exceptional Students [A158]  
 "Exploring the Solar System: A Multisensory Approach" [A161]  
 "Journey to the Edge of Space and Time" Planetarium Show [A1]  
 MicroObservatory Online Telescopes [A281]  
 Monthly Observatory Nights at the Harvard-Smithsonian Center for Astrophysics [A345]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Sci-Fi Movie Nights at the Harvard-Smithsonian Center for Astrophysics [A357]  
 Smithsonian Teacher's Night [A206]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
 Structure and Evolution of the Universe (SEU) Forum Informal Science Education Programs [A375]  
 Structure and Evolution of the Universe (SEU) in the Classroom [A217]

#### **B14. Sun-Earth Connection Education Forum (SECEF)**

Description: The SEC Education Forum shares the exciting discoveries and knowledge from NASA Sun-Earth connection missions and research programs with educators, students, and the general public. The Sun-Earth connection partnership brings together the rich expertise of scientists, educators, and museum personnel to develop innovative products and programs. Our goal is to contribute to the improvement of precollege science education and increase science literacy at all levels, focusing attention on the active Sun and its effects on Earth.

Lead: Dr. Richard Vondrak, NASA Goddard Space Flight Center, Mail Code 690, Greenbelt, MD 20771.  
 E-mail: [rvondrak@pop600.gsfc.nasa.gov](mailto:rvondrak@pop600.gsfc.nasa.gov). Phone: 301-286-8112.

Contact: Dr. Isabel Hawkins, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.  
 E-mail: [isabelh@ssl.berkeley.edu](mailto:isabelh@ssl.berkeley.edu). Phone: 510-643-5662.

URL: <http://sunearth.gsfc.nasa.gov>

Activities: Exceptional Space Science Materials for Exceptional Students [A158]  
 From the Sun to the Star Nations [A50]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Interactive Exhibits at Community Events [A339]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 "Northern Lights" Planetarium Show [A3]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Shares Sun-Earth Connection Science Through Conferences [A356]  
 Science@NASA [A359]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Space Science Workshops for Educators [A210]  
 "Space Weather Center" Traveling Exhibit [A12]  
 STEREO/IMPACT Formal Education Teacher Inservice Preparation [A213]  
 Sun-Earth Connection Education and Public Outreach Electronic Newsletter [A379]  
 Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

Sun-Earth Connection Education Forum (SECEF) Formal Education Curriculum Development [A241]  
 Sun-Earth Connection Education Forum (SECEF) Formal Education Student Support [A297]  
 Sun-Earth Connection Education Forum (SECEF) Formal Education Systemic Improvement [A137]  
 Sun-Earth Connection Education Forum (SECEF) Informal and Public Outreach [A30]  
 Sun-Earth Connection Education Forum (SECEF) Outreach Workshops: Science of the Sun [A380]  
 Sun-Earth Connection Education Forum (SECEF) Preservice Teacher Education [A220]  
 Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
 Sun-Earth Connection Education Forum (SECEF) Targeted Outreach to Native Americans [A59]  
 Sun-Earth Day [A381]  
 Workshops, Sessions, and Seminars for Scientists on K-14 Education and Public Outreach [A398]

## Broker/Facilitators

### B15. DePaul Broker/Facilitator (DePaul B/F)

**Description:** The DePaul University Broker/Facilitator assists space scientists and members of the education community in the States of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin to form partnerships that realize high-leverage opportunities for education and outreach.

**Lead:** Dr. Lynn Narasimhan, DePaul University, Interdisciplinary Science and Technology Center,  
 1 East Jackson Street, Chicago, IL 60604.

E-mail: [cnarasim@depaul.edu](mailto:cnarasim@depaul.edu). Phone: 773-325-1854.

**URL:** <http://analyzer.depaul.edu/NASABroker/>

**Activities:** Chicago Teacher Advisory [A133]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Planetarium Learning and Teaching Opportunities [A27]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Small-Grants Program for Midwestern Teachers [A205]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Space Day in Chicago [A292]  
 Space Science Curriculum Development and Training for the Milwaukee Public Schools [A135]  
 Space Science for Illinois/Indiana Teachers [A209]

### B16. Lunar and Planetary Institute Broker/Facilitator (LPI B/F)

**Description:** This is one of seven brokers/facilitators for education and public outreach within the NASA Office of Space Science Education Support Network. The six-State region served includes Texas, Louisiana, Oklahoma, Kansas, New Mexico, and Arizona.

**Lead:** Dr. Robert Herrick, Lunar and Planetary Institute, 3600 Bay Area Boulevard, Houston, TX 77058-1113.

E-mail: [herrick@lpi.usra.edu](mailto:herrick@lpi.usra.edu).

**URL:** <http://www.lpi.usra.edu/education>

**Activities:** Explore! Fun with Science [A330]  
 Field Workshops for Scientist-Teacher Teams [A163]  
 Lunar and Planetary Institute (LPI) Speakers Bureau [A341]  
 Lunar and Planetary Science Conference (LPSC) Workshop for Scientists [A395]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Scientist-Teacher Cooperation Projects [A201]  
 Space Day at Bacliff, TX [A291]

### B17. Mid-Atlantic Region Space Science Broker/Facilitator (MARSSB)

**Description:** The Mid-Atlantic Region Space Science Broker assists space scientists and members of the education community in the States of Delaware\*, Kentucky\*, Maryland\*, New Jersey, New York, Ohio, Pennsylvania, Virginia\*, West Virginia, and Washington, DC.\* Its goal is to form partnerships that realize high-leverage opportunities for education and public outreach (E/PO) events and services. (\*These areas are shared with the SERCH Broker/Facilitator.) The Center for Educational Technologies established the MARSSB program as a newly organized Broker/Facilitator. It has served as a regional point of contact for scientists and educators seeking



information or involvement in the Office of Space Science (OSS) E/PO program through the Web site, mailings, and personal communications. As part of its program “ramp-up,” it created a database inventory of educators, scientists, and science centers in the mid-Atlantic region. This resource is designed to match individuals with institutions and groups based on the geographic location and areas of interest. MARSSB initiated contact with stakeholders in its region (such as the University of Pittsburgh and Allegheny Observatory) to introduce the services it has to offer and identify E/PO needs.

Lead: Dr. Nitin Naik, Wheeling Jesuit University, 316 Washington Avenue, Wheeling, WV 26003.  
E-mail: [nitin.naik-1@nasa.gov](mailto:nitin.naik-1@nasa.gov). Phone: 202-358-1110.

Contact: Dr. Laurie Ruberg, Wheeling Jesuit University, 316 Washington Avenue, Wheeling, WV 26003.  
E-mail: [lruberg@cet.edu](mailto:lruberg@cet.edu). Phone: 304-243-2480.

URL: <http://www.cet.edu/ossbroker>

Activities: Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
Professional Societies of Minority Scientists/OSS Collaboration [A57]  
Science Education, Communication, and Math Experience (SECME) [A200]

### **B18. New England Space Science Initiative in Education Broker/Facilitator (NESSIE B/F)**

Description: Founded in January 2002, NESSIE is the Broker/Facilitator for the New England States of Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, and Maine. NESSIE is charged with catalyzing and fostering collaborations among space scientists and educators within both the formal and informal education communities. NESSIE itself is a collaboration of scientists and science educators at the Museum of Science, Harvard-Smithsonian Center for Astrophysics, and Tufts University. Its primary goals are to 1) broker partnerships between space scientists and educators, 2) facilitate a wide range of educational and public outreach activities, and 3) examine and improve space science education methods. NESSIE's unique strengths reside in its prime location (the Museum of Science), its diverse mix of scientists and educators, and its dedicated board of advisors. NESSIE's role as a clearinghouse and facilitator of space science education is being realized through its interactive Web site and via its targeted meetings, workshops, and conferences that involve scientists and educators. Special efforts are being made to reach underserved groups by tailoring programs to their particular education needs and interests. These efforts are building on the experiences of prior and ongoing programs in space science education at the Museum of Science, Harvard-Smithsonian Center for Astrophysics, Tufts University, and NASA.

Lead: Dr. Cary Sneider, Museum of Science, Programs Division, Science Park, Boston, MA 02114-1099.  
E-mail: [nessie@mos.org](mailto:nessie@mos.org). Phone: 617-589-0227.

Contact: Dr. William Waller, Museum of Science, Programs Division, Science Park, Boston, MA 02114-1099.  
E-mail: [wwaller@mos.org](mailto:wwaller@mos.org). Phone: 617-589-0227.

URL: <http://www.mos.org/nessie>

Activities: Current Science and Technology Center [A6]  
“Exploring the Solar System: A Multisensory Approach” [A161]  
New England Space Science Initiative in Education (NESSIE) Outreach to Formal Educators [A191]  
Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
Professional Societies of Minority Scientists/OSS Collaboration [A57]

### **B19. Southeast Regional Clearinghouse Broker/Facilitator (SERCH B/F)**

Description: SERCH is a NASA Office of Space Science (OSS)-funded program whose purpose is to promote space science awareness and enhance interest in science, math, and technology through the use of NASA OSS mission data, information, and educational products. SERCH works closely with 14 Space Grant consortia (in Alabama; Arkansas; Washington, DC; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; North Carolina; Puerto Rico; South Carolina; Tennessee; and Virginia) throughout the southeastern United States. SERCH serves as a Broker and Facilitator of services between the region's education community and researchers who are involved in OSS missions. The goals of SERCH are to 1) develop a network of educators and researchers interested in space science; 2) be an effective interface between researchers and educators in the area of space science; 3) be a primary information and resource clearinghouse for space science data, information, and educational products; 4) support OSS mission scientists in their education and public outreach activities; 5) facilitate the modification of OSS materials to meet the needs of diverse education environments; 6) be a leader in serving exceptional students and the general public; 7) enhance minority involvement across NASA OSS programs; and 8) develop an accessible nationwide Geographic Information System (GIS) database that provides spatially related information of targeted NASA education resources.

Lead: Dr. Cassandra Runyon, College of Charleston, Geology Department, 66 George Street, Charleston, SC 29424.

E-mail: [cass@cofc.edu](mailto:cass@cofc.edu). Phone: 843-953-8279.

URL: <http://serch.cofc.edu/serch/>

Activities: Backyard Astronomy [A312]  
 “Earth in Space”—Capturing Student Curiosity [A155]  
 Enhancement of the Space Science Research Program at South Carolina State University [A37]  
 Exceptional Space Science Materials for Exceptional Students [A158]  
 “Exploring the Solar System: A Multisensory Approach” [A161]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 South Carolina Coalition for Science and Mathematics Education (SCCSME) [A134]  
 STARLAB Portable Planetarium Training [A212]  
 Students Acquiring Real Science [A376]  
 Video and Laboratory Curriculum in NASA OSS Themes for DC Public Schools [A243]

## **B20. Space Science Institute Broker/Facilitator (SSI B/F)**

Description: The Space Science Institute (SSI) of Boulder, CO, is home to one of seven regional broker/facilitator programs that support the education and public outreach (E/PO) efforts of the NASA Office of Space Science (OSS). The core mission of Broker/Facilitators is to cultivate opportunities and partnerships between the education and space science communities that can address important education needs in their respective regions. The SSI B/F program now serves a large swath of the United States, starting in the upper Midwest in North Dakota and extending to California (Arizona, California, Colorado, Nebraska, North Dakota, New Mexico, Nevada, South Dakota, and Utah). SSI is building on 4 years of “lessons learned” in the broker/facilitator role. The goals of our SSI B/F program are to provide strategically valuable support for 1) space scientists’ effective E/PO involvement, 2) formal education (emphasizing State-based agendas), 3) informal education (emphasizing planetarium associations, Girl Scouts, and traveling science exhibits), and 4) underserved populations (emphasizing indigenous and Latino educators). This strategic support includes providing professional development opportunities, facilitating access to and use of exemplary materials, and facilitating E/PO participation and/or partnership. Key collaborators of the SSI B/F program include leaders from two western planetarium associations, the Girl Scouts-Mile Hi Council, mobile education programs, traveling exhibit programs, and E/PO leads at major scientific research institutions in our region. To begin to address the vastness of our region, we are developing new electronic resources (E-Brokering) that include the quarterly “Bulletin of NASA Space Science Education Opportunities in the Western U.S.,” and a Web-based “Menu of Opportunities for Scientists in Education” (“MOSIE”).

Lead: Dr. Cheryl Lynn Morrow, Space Science Institute, 3100 Marine Street, Suite A353, Boulder, CO 80303-1058.  
 E-mail: [camorrow@colorado.edu](mailto:camorrow@colorado.edu). Phone: 303-492-7321.

Contact: Ms. Christy Edwards, Space Science Institute, 3100 Marine Street, Suite A353, Boulder, CO 80303-1058.  
 E-mail: [edwardcl@colorado.edu](mailto:edwardcl@colorado.edu). Phone: 303-735-4880.

URL: <http://ssibroker.colorado.edu/broker/>

Activities: Astrobiology Workshop for Planetarium Educators [A13]  
 From the Sun to the Star Nations [A50]  
 Interactive Exhibits at Community Events [A339]  
 Kinesthetic Astronomy Curricular Materials Development [A233]  
 Mars: Informal Educator Workshops [A22]  
 “MarsQuest” Planetarium Show [A2]  
 “MarsQuest” Traveling Exhibit [A10]  
 Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
 Outreach to Native Americans in the Western Region [A56]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]  
 Space Science Workshops for Educators [A210]  
 “Space Weather Center” Traveling Exhibit [A12]  
 Workshops, Sessions, and Seminars for Scientists on K-14 Education and Public Outreach [A398]

## **B21. Space Science Network Northwest Broker/Facilitator (S2N2 B/F)**

Description: S2N2 uses a variety of approaches to make formal and informal educators aware of NASA Office of Space Science (OSS) programs, materials, and opportunities. S2N2 helps to create sustainable partnerships among formal and informal educators and NASA OSS missions, forums, and space scientists. S2N2 operates by having

- a central office at the University of Washington and representatives in the partner States of Washington, Arkansas, Hawaii, Oregon, Montana, Idaho, and Wyoming.
- Lead: Dr. Julie Lutz, University of Washington, 60 Johnson Hall, Seattle, WA 98195-1310.  
E-mail: [nasaerc@u.washington.edu](mailto:nasaerc@u.washington.edu). Phone: 206-543-0214.
- Activities: Field Workshops for Scientist-Teacher Teams [A163]  
Office of Space Science (OSS) Conference on Education and Public Outreach [A397]  
Professional Societies of Minority Scientists/OSS Collaboration [A57]  
Summer Solstice Celebration [A378]  
Sun-Earth Day Information for Tribal Schools [A60]

## ASTRONOMICAL SEARCH FOR ORIGINS (ASO) MISSIONS

### Major Missions

#### B22. Hubble Space Telescope (HST)

- Description: The Office of Public Outreach (OPO) at the Space Telescope Science Institute (STScI) was created to share the amazing discoveries of the Hubble Space Telescope with the American public. We are privileged to be the focal point of public attention for a storied NASA/European Space Agency (ESA) space science mission to which thousands of engineers, programmers, technicians, administrators, and scientists have devoted their professional gifts. We have developed a multitude of products and programs that have capitalized on the intense interest in Hubble to inform and inspire millions of Americans and many others around the globe.
- Lead: Dr. Ian Griffin, Space Telescope Science Institute, Office of Public Outreach, 3700 San Martin Drive, Baltimore, MD 21218.  
E-mail: [griffin@stsci.edu](mailto:griffin@stsci.edu). Phone: 410-338-4567.
- URL: <http://hubblesite.org/>
- Activities: "Center of Galaxy M51: The Whirlpool Galaxy" [A75]  
"Galaxy Hunter" [A89]  
Hubble Space Telescope (HST) Amateur Astronomical Community Events [A334]  
Hubble Space Telescope (HST) Formal Education [A98]  
Hubble Space Telescope (HST) Speakers Bureau [A335]  
Hubble Space Telescope (HST) Workshops and Presentations [A336]  
Hubble Space Telescope (HST): Amazing Space [A99]  
Hubble Space Telescope: Immersive Dome Visualizations for Planetariums [A19]  
Hubble Space Telescope: International Planetarium Society Slide Service [A20]  
Hubble Space Telescope: Online Broadcast-Quality Hubble Video Clip Library [A21]  
"Hubble Space Telescope: New Views of the Universe" (version 1) [A7]  
"Hubble Space Telescope: New Views of the Universe" (version 2) [A8]  
Hubble Space Telescope: ViewSpace [A9]  
"Mission Mastermind" [A111]  
National Conference for the International Technology Education Association [A188]  
National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
Open Night at the Space Telescope Science Institute [A351]  
"Planet Impact" [A118]  
Science Concepts in Context [A239]  
Science@NASA [A359]  
U.S. Physics Team Tribute [A387]  
Windows to the Universe [A245]

#### B23. James Webb Space Telescope (JWST)

- Description: The JWST education and public outreach program (E/PO) is led by the Office of Public Outreach (OPO) of the Space Telescope Science Institute (STScI). With the launch planned for 2009 or 2010, a modest level of resources is planned until 2006 or 2007. As OPO at STScI is also responsible for Hubble E/PO, we are using the interest in Hubble to introduce the public to this future mission as the next major leap forward in space discovery. Through the Origins Education Forum, we are keeping abreast of the activities of the SIRTf and SOFIA missions to promote public understanding of infrared light and will seek opportunities to partner with them.

One new program will be initiated in the upcoming year by the University of Arizona Near Infrared Camera (NIRCam) science team to develop astronomy camps specifically designed for Girl Scouts.

Lead: Ms. Peg Stanley, Space Telescope Science Institute, Office of Public Outreach, 3700 San Martin Drive, Baltimore, MD 21218.  
E-mail: [pstanley@stsci.edu](mailto:pstanley@stsci.edu). Phone: 410-338-4536.

URL: <http://nextgen.stsci.edu>

#### **B24. Space Infrared Telescope Facility (SIRTF)**

Description: The SIRTF Science Center's education and public outreach program is actively promoting public understanding of infrared and other invisible forms of light. We have designed a suite of Web sites, audiovisual products, and classroom activities to achieve our education goals. We are also currently conducting an international naming contest for the SIRTF spacecraft as well as preparing launch support materials.

Lead: Dr. Michelle Thaller, SIRTF Science Center/California Institute of Technology, Mail Stop 220-6, 1200 East California Boulevard, Pasadena, CA 91125.  
E-mail: [thaller@ipac.caltech.edu](mailto:thaller@ipac.caltech.edu). Phone: 626-395-8670.

URL: <http://sirtf.caltech.edu>

Activities: "Astronomia Multi-Onda!" [A67]  
"Beyond the Visible Universe: Teaching Invisible Astronomy" [A144]  
"Calor y Temperatura" [A71]  
"El Experimento del Herschel!" [A84]  
From the Outer Planets to the Inner City [A49]  
"Heat and Temperature" Web Site [A95]  
"Infrared Image Gallery" Web Site [A101]  
"Infrared Yellowstone" Web Site [A102]  
"Infrared Zoo" Web Site [A103]  
Multiwavelength Astronomy Web Site [A112]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
"Our Infrared World" Web Site [A117]  
Scientists Mentoring Astronomy Research Teams of Tomorrow (SMARTT) [A42]  
SIRTF and SOFIA Online Course [A202]  
SIRTF Conference Support [A203]  
SIRTF Teacher Workshops/Inservices [A204]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]  
Space Infrared Telescope Facility (SIRTF) Classroom Visits [A293]  
Space Infrared Telescope Facility (SIRTF) Large Public Presentations [A367]  
Space Place Contributions to ITEA's "The Technology Teacher" [A369]  
Space Place Newspaper Contributions [A371]  
The Invisible Universe Online: The Search for Astronomical Origins for Teachers [A225]  
"The Multiwavelength Universe" [A128]  
"What Is It? Learn About Infrared Images" Web Site [A132]

#### **B25. Stratospheric Observatory for Infrared Astronomy (SOFIA)**

Description: SOFIA's education and public outreach (E/PO) program contributes to the improvement of the American public's scientific, mathematical, and technological literacy and to an awareness and understanding of the importance and value of research in science. SOFIA will be a world-class research observatory, designed from the ground up with the capability to allow visiting educators and journalists to closely observe and participate in the research process. SOFIA's E/PO program will bring the excitement, hardships, challenges, discoveries, teamwork, and educational value of the observatory to students (precollege, undergraduate, and graduate), teachers, and the general public on a national and international scale, as SOFIA is a joint U.S.-German project. Programs include 1) Airborne Astronomy Ambassadors—trained educators fly on research missions and compose a national network of master educators who conduct teacher workshops and public presentations; 2) Education Partners Program—SOFIA scientists, observers, instrument builders, engineers, technicians, flight crews, and educators partner with teachers in their local communities who may fly on SOFIA; 3) Science Literacy and Education Program—annual symposia are held at the SOFIA Science and Mission Operations Center for undergraduate instructors, science and technology center staff, and planetarium directors who may fly on SOFIA; 4) SOFIA Visiting Educators—each year, a small number of experienced educators will join the SOFIA E/PO staff

as flight facilitators and E/PO outreach personnel; and 5) SOFIA's Web site—the E/PO program will support a public affairs team that works closely with the NASA Office of Public Affairs to communicate SOFIA science effectively. SOFIA is being developed and will be operated for NASA and the German Aerospace Center by the Universities Space Research Association (USRA). The E/PO program is jointly conducted by the SETI Institute, the Astronomical Society of the Pacific, and members of the USRA SOFIA team.

- Lead: Ms. Edna DeVore, SETI Institute, 2035 Landings Drive, Mountain View, CA 94043.  
E-mail: [edevore@seti.org](mailto:edevore@seti.org). Phone: 650-960-4538.
- Contact: Dr. Michael Bennett, Astronomical Society of the Pacific (ASP), 390 Ashton Avenue, San Francisco, CA 94112.  
E-mail: [mbennett@astrosociety.org](mailto:mbennett@astrosociety.org). Phone: 415-337-1100.
- URL: <http://sofia.arc.nasa.gov>
- Activities: Active Astronomy: Classroom Activities for Learning About Infrared (IR) Light [A62]  
Aeronautical Exposition for Students [A249]  
Air Expo for the Public [A305]  
"Astronomy at 41,000 Feet—The Story of SOFIA" [A309]  
"Beyond the Visible Universe: Teaching Invisible Astronomy" [A144]  
"Explore the Invisible Universe" [A159]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
Parsons School of Design Student Web Project [A286]  
SIRTF and SOFIA Online Course [A202]  
SIRTF Conference Support [A203]  
SIRTF Teacher Workshops/Inservices [A204]  
"SOFIA—Astronomy From 41,000 Feet" [A361]  
Stratospheric Observatory for Infrared Astronomy (SOFIA) Exhibit at Conferences [A215]  
Stratospheric Observatory for Infrared Astronomy (SOFIA) Visitors' Center Exhibit [A374]  
The Invisible Universe Online: The Search for Astronomical Origins for Teachers [A225]

## Explorers

### B26. Far-Ultraviolet Spectroscopic Explorer (FUSE)

- Description: FUSE is designed for a very specialized and unique task that is complementary to other NASA missions. FUSE looks at light in the far ultraviolet portion of the electromagnetic spectrum (approximately 90 to 120 nanometers), which is unobservable with other telescopes. FUSE observes these wavelengths with much greater sensitivity and resolving power than instruments previously used to study light in this wavelength range. The FUSE education and public outreach program has developed educational kits for middle and high school students, conducts educator workshops, and provides exhibits for museums.
- Lead: Ms. Luciana Bianchi, Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099.  
E-mail: [bianchi@skysrv.pha.jhu.edu](mailto:bianchi@skysrv.pha.jhu.edu). Phone: 410-516-4009.
- URL: <http://fuse.pha.jhu.edu/outreach/>
- Activities: Science@NASA [A359]

## Navigator

### B27. Navigator Program (Navigator)

- Description: The Navigator projects are united in their goal to find and characterize planets like Earth in orbit around stars other than the Sun. Collectively, they represent a voyage of unprecedented scope and ambition, promising insight into humankind's most timeless questions: Where did we come from? and Are we alone? The goal of the Navigator public engagement plan is to invite all Americans to participate in this journey of discovery.
- Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.  
E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.
- URL: <http://planetquest.jpl.nasa.gov>
- Activities: From the Outer Planets to the Inner City [A49]  
Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
Navigator: Educator Workshops [A189]  
Navigator: Imagine A New World Program [A54]  
Navigator: Minority Outreach Program [A55]



Navigator: Science Events [A349]  
 Navigator: Student Support [A283]  
 New Opportunities Through Minority Initiatives in Space Science [A39]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

---

### **B28. Michelson Science Center (MSC)**

**Description:** The Michelson Science Center is a science operations and analysis service organization for selected NASA Origins theme projects and the scientists and engineers who use them. The MSC facilitates the timely and successful execution of Origins theme science by providing software infrastructure, science operations, and consulting to Navigator projects and their user communities. The Michelson Science Center participates in the overall Navigator education and public outreach program.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.  
 E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

**URL:** <http://planetquest.jpl.nasa.gov/>

**Activities:** Navigator: Educator Workshops [A189]  
 Navigator: Imagine A New World Program [A54]  
 Navigator: Science Events [A349]  
 Navigator: Student Support [A283]

---

### **B29. Keck Interferometer (KECK)**

**Description:** The Keck Interferometer participates in the overall Navigator education and public outreach program.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.  
 E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

**URL:** <http://planetquest.jpl.nasa.gov>

**Activities:** Navigator: Educator Workshops [A189]  
 Navigator: Imagine A New World Program [A54]  
 Navigator: Minority Outreach Program [A55]  
 Navigator: Science Events [A349]  
 Navigator: Student Support [A283]  
 "Planet Quest" Activities for Students [A119]  
 "Planet Quest: The Search for Another Earth" [A120]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

---

### **B30. Large Binocular Telescope Interferometer (LBTI)**

**Description:** The Large Binocular Telescope Interferometer participates in the overall Navigator education and public outreach program.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.  
 E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

**URL:** <http://planetquest.jpl.nasa.gov/>

---

### **B31. Planetary Imager (PI)**

**Description:** The Planetary Imager participates in the overall Navigator education and public outreach program.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.  
 E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

**URL:** <http://planetquest.jpl.nasa.gov/>

---

### **B32. Space Interferometry Mission (SIM)**

**Description:** The Space Interferometry Mission participates in the overall Navigator education and public outreach program.

**Lead:** Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.  
 URL: <http://planetquest.jpl.nasa.gov/>  
 Activities: National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Navigator: Educator Workshops [A189]  
 Navigator: Imagine A New World Program [A54]  
 Navigator: Minority Outreach Program [A55]  
 Navigator: Science Events [A349]  
 Navigator: Student Support [A283]  
 "Planet Quest" Activities for Students [A119]  
 "Planet Quest: The Search for Another Earth" [A120]  
 Scientists Mentoring Astronomy Research Teams of Tomorrow (SMARTT) [A42]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

### **B33. StarLight [New Millennium] (ST-3)**

Description: A technology pathfinder, StarLight is a technology precursor to Terrestrial Planet Finder (TPF), a future mission designed to search for and characterize habitable planets around stars other than the Sun. Previously scheduled for launch in 2006, StarLight has been redirected to focus on the development of ground demonstration of technologies that support formation flying interferometry for TPF. Space Place has involved ST3 in the following events/activities: We attend conferences to promote "The Space Place" and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos, and aquariums in the United States have formed Club Space Place partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships, we promote "The Space Place" Web site and the NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly, interdisciplinary, hands-on activities that are related to space or Earth science. These quarterly activities go to Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in English and Spanish. The combined readership for that 1 day a month adds up to more than 2.5 million. The articles always end with information on activities, a link to "The Space Place" Web site, and links to mission Web sites. Diane Fisher submits articles to the "Technology and Children" magazine four times a year and to "The Technology Teacher" magazine eight times a year. Each article, published under a Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches up to an estimated 1,400 teachers and their students (up to 42,000 children), and each "The Technology Teacher" publication reaches an estimated 8,000 teachers and their students (up to 224,000 children). Articles are also posted on ITEA's Web site which reaches an even wider audience. "The Space Place" Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. "The Space Place" is supported by the New Millennium program. It reaches an average of 3,000 viewers a day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, Mail Stop 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.jpl.nasa.gov>

Activities: Navigator: Educator Workshops [A189]  
 Navigator: Imagine A New World Program [A54]  
 Navigator: Minority Outreach Program [A55]  
 "Planet Quest" Activities for Students [A119]  
 "Planet Quest: The Search for Another Earth" [A120]

### **B34. Terrestrial Planet Finder (TPF)**

Description: The Terrestrial Planet Finder participates in the overall Navigator education and public outreach program.

Lead: Mr. W. Michael Greene, NASA Jet Propulsion Laboratory, Mail Stop 301-486, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [william.m.greene@jpl.nasa.gov](mailto:william.m.greene@jpl.nasa.gov). Phone: 818-354-1277.

URL: <http://planetquest.jpl.nasa.gov/>

Activities: Navigator: Educator Workshops [A189]  
 Navigator: Imagine A New World Program [A54]

Navigator: Minority Outreach Program [A55]  
 Navigator: Science Events [A349]  
 Navigator: Student Support [A283]  
 "Planet Quest" Activities for Students [A119]  
 "Planet Quest: The Search for Another Earth" [A120]  
 Scientists Mentoring Astronomy Research Teams of Tomorrow (SMARTT) [A42]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

## Other NASA Programs

### B35. NASA Astrobiology Institute (NAI)

**Description:** At NAI, we are building a future community of astrobiologists while expanding the public's understanding of the nature and importance of our work. NAI's education and public outreach (E/PO) program is distributed to all its lead teams. Each team directs a local effort with specific emphasis on that team's research and expertise while contributing to larger collaborative projects. These include Web sites, print products, and curriculum supplements, as well as educational programs and activities, internships, presentations, and exhibits. Educating and training the next generation is another important aspect of NAI's mission, essential to ensuring the continuity and longevity of the field of astrobiology. Many of our members train new researchers directly in their academic programs and laboratories. While some of these courses and programs are called "astrobiology," many of them reside within traditional astronomy, biology, chemistry, geology, and planetary science departments. In this way, NAI members are growing the field of astrobiology, both as an independent discipline and through the expansion of traditional approaches.

**Lead:** Ms. Krisstina Wilmoth, NASA Astrobiology Institute (NAI), Mail Stop 240-1, Ames Research Center, Moffett Field, CA 94035.

E-mail: [kwilmoth@mail.arc.nasa.gov](mailto:kwilmoth@mail.arc.nasa.gov). Phone: 650-604-6137.

**Contact:** Ms. Karen Dodson, NASA Astrobiology Institute (NAI), Mail Stop 240-1, Ames Research Center, Moffett Field, CA 94035.

E-mail: [kdodson@mail.arc.nasa.gov](mailto:kdodson@mail.arc.nasa.gov). Phone: 650-604-4145.

**URL:** <http://nai.arc.nasa.gov>

**Activities:** Arizona State University (ASU) Space Photography Laboratory Tours [A250]

"Ask an Astrobiologist" [A251]

"Astro-Venture" [A253]

Astrobiology Academy [A254]

Astrobiology Article in "Science Scope" [A63]

Astrobiology at UCLA [A306]

Astrobiology High School Curriculum Review Panel [A230]

"Astrobiology Micro\*Scope" Web Site [A231]

Astrobiology Module for Toward Other Planetary Systems (TOPS) Teacher Workshop [A141]

Astrobiology on the School Front: Interning and Mentoring [A255]

Astrobiology Pathfinder [A256]

Astrobiology Science Conference Public Talks [A307]

Astrobiology Television Program: "The Stories Rocks Tell" [A308]

Astrobiology Workshop for Planetarium Educators [A13]

"Astrobiology: Discovering New Worlds of Life" Poster [A64]

Astrobiology: "The Origins and Early Evolution of Life" Educator Workshop [A142]

Astrobiology: "The Search for Life in the Universe" Magazine [A65]

Astrobiology: "The Search for Water" [A66]

Astromaterials-Astrobiology Student Presentations [A257]

ASU Earth Science Day [A310]

Carnegie Academy for Science Education Summer Institute [A146]

Center for Astrobiology and Early Evolution (CABEE) Newsletter [A315]

Chemistry and Astrobiology Educational Films [A77]

"Extremophiles: Life on the Edge" Astrobiology Teacher Workshop [A162]

"Fingerprints of Life" CD and Web Site [A87]

"Fingerprints of Life?"—Development of Classroom Activities, Web Site, and CD-ROM [A232]

Formal and Informal Education Workshops with an Astrobiology Component [A164]

Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 "It's Out There—Extreme Life!" NSTA Short Course [A175]  
 "Kinesthetic Astronomy" for Educators and Scientists [A176]  
 "Life and Living in Space" Teacher Workshop [A177]  
 "Living in the Microbial World" Teacher Workshop [A179]  
 Mysteries of Microbes: Fascinating Fieldwork [A235]  
 NASA Astrobiology Institute (NAI) Lead Team Presentations and Lectures [A346]  
 NASA Astrobiology Institute (NAI) Minority Faculty Fellowship Program [A53]  
 NASA Astrobiology Institute (NAI) Video Collection Project [A396]  
 Project AstroBio [A195]  
 Science Concepts in Context [A239]  
 Science@NASA [A359]  
 See ASU 2002 [A360]  
 Skymobile [A11]  
 Space Day 2002 at Penn State [A366]  
 Space Science Workshops for Educators [A210]  
 "The Extremities: Geology and Life in Yellowstone and Implications for Other Worlds" [A224]  
 "The Joy of Science" Video Series [A127]  
 Voyages Through Time (VTT) Curriculum [A244]  
 What Is Nature Doing? Campfire Reflections on the History of Life in the Cosmos [A391]  
 Women in Science and Engineering (WISE) Camp—Science Projects in Astrobiology [A61]  
 Yellowstone National Park Resources and Issues Guide [A392]  
 Yellowstone National Park Wayside Sign Exhibit [A393]  
 Young Astronauts [A304]

### B36. Two Micron All Sky Survey (2MASS)

**Description:** The Two Micron All Sky Survey project was designed to close the gap between our current technical capability and our knowledge of the near-infrared sky. In addition to providing a context for the interpretation of results obtained at infrared and other wavelengths, 2MASS is providing direct answers to immediate questions on the large-scale structure of the Milky Way and the local Universe. The optimal use of the next generation of infrared space missions, such as the Hubble Space Telescope Near Infrared Camera and Multi-Object Spectrometer (HST NICMOS), the Space Infrared Telescope Facility (SIRTF), and the Next Generation Space Telescope (NGST) as well as powerful ground-based facilities, such as Keck I, Keck II, and Gemini, required a new census with vastly improved sensitivity and astrometric accuracy than was previously available. To achieve these goals, 2MASS uniformly scanned the entire sky in three near-infrared bands to detect and characterize point sources brighter than about 1 mJy in each band, with a signal-to-noise ratio (SNR) greater than 10, using a pixel size of 2.0 arcseconds. This achieved an 80,000-fold improvement in sensitivity, relative to earlier surveys.

**URL:** <http://www.ipac.caltech.edu/2mass/>

**Activities:** Science Concepts in Context [A239]  
 Scientists Mentoring Astronomy Research Teams of Tomorrow (SMARTT) [A42]

## SOLAR SYSTEM EXPLORATION (SSE) MISSIONS

### Major Missions

#### B37. Cassini/Huygens Probe

**Description:** The Cassini-Huygens education and public outreach mission is dedicated to bringing the excitement of the Cassini mission and the Saturn system to audiences throughout the Nation and abroad. Educational activities, cooperative educator programs, educator conferences, public Web access, media support and releases, museum participation, and the Cassini speakers group are just a few of the ways we seek to engage the public in this multinational exploration program to Saturn.

**Contact:** Ms. Shannon McConnell, NASA Jet Propulsion Laboratory, Mail Stop 230-101, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Shannon.L.Mcconnell@jpl.nasa.gov](mailto:Shannon.L.Mcconnell@jpl.nasa.gov). Phone: 818-393-6780.

**URL:** <http://saturn.jpl.nasa.gov>

Activities: Cassini Classroom Visits [A258]  
 Cassini Conferences [A147]  
 Cassini Sky Watching Events [A313]  
 Cassini Talks [A314]  
 "Cassini Unveils the Myth" [A72]  
 From the Outer Planets to the Inner City [A49]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Space Science Workshops for Educators [A210]  
 Windows to the Universe [A245]

### **B38. Galileo**

Description: The Galileo mission has a 6-year legacy of the exploration of Jupiter and its moons. Since arriving at Jupiter in 1995, the Galileo spacecraft has orbited the planet and its moons more than 30 times. Ongoing volcanic activity on Io, a magnetic field at Ganymede, and water on Europa are only a few of the thought-provoking discoveries made during Galileo's mission. Educational activities, Web access, information, media support, and educator and student conferences compose a sampling of the engaging and exciting ways that Galileo outreach continues to reach out into the community to bring Jupiter to people around the world.

Lead: Ms. Shannon McConnell, NASA Jet Propulsion Laboratory, Mail Stop 230-101, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Shannon.L.Mcconnell@jpl.nasa.gov](mailto:Shannon.L.Mcconnell@jpl.nasa.gov). Phone: 818-393-6780.

URL: <http://www.jpl.nasa.gov/galileo/>

Activities: American Association of University Women (AAUW) Math and Science Conference [A48]  
 From the Outer Planets to the Inner City [A49]  
 Galileo Classroom Visits [A263]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Science@NASA [A359]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Windows to the Universe [A245]

### **B39. Jet Propulsion Laboratory Solar System Exploration Theme Lead (JPL SSE Theme)**

Description: The Jet Propulsion Laboratory (JPL) Solar System Theme Lead coordinates the activities of JPL's Solar System exploration mission outreach coordinators and specialists in media relations, television production, Internet services, and education (both formal and informal). The Lead also coordinates the science data analysis and research activities of the missions.

Lead: Ms. Anita Sohus, NASA Jet Propulsion Laboratory, Mail Stop 233-201, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Anita.M.Sohus@jpl.nasa.gov](mailto:Anita.M.Sohus@jpl.nasa.gov). Phone: 818-354-6613.

URL: <http://www.jpl.nasa.gov/pscischool/>

Activities: Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 "MarsQuest" Planetarium Show [A2]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Space Science Workshops for Educators [A210]



## Discovery

### B40. Discovery Program Support Office (DPSO)

**Description:** NASA's Discovery program comprises of a series of low-cost, highly focused, competitively selected planetary science investigations. Discovery missions aim to enhance our understanding of the Solar System by exploring the planets, their moons, and other small bodies by using innovative approaches to assure the highest science value for the cost. Ten missions have been selected since the program began in 1992. The Discovery program education and public outreach (E/PO) efforts are designed to promote the program and awareness of the missions. This is done through a Web site, a quarterly newsletter, the development of outreach products and informational materials, and by giving presentations in a variety of venues. The Discovery program works with Discovery mission E/PO personnel to identify and develop E/PO opportunities, to coordinate with the program, and to assure that mission activities are consistent with Office of Space Science E/PO strategy.

**Lead:** Ms. Shari Asplund, NASA Jet Propulsion Laboratory, Mail Stop 180-201, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [shari.e.asplund@jpl.nasa.gov](mailto:shari.e.asplund@jpl.nasa.gov). Phone: 818-354-7280.

**URL:** <http://discovery.nasa.gov>

**Activities:** From the Outer Planets to the Inner City [A49]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

### B41. Comet Nucleus Tour (CONTOUR)

**Description:** The education and public outreach efforts of the CONTOUR mission are aimed at bringing the thrill of exploration and the wonder of discovery into classrooms and homes through unique educational experiences. We invite teachers, students, and the public to participate in scientific inquiry and discovery and to gain insight into the complex and awesome nature of comets. Through media, the Internet, and classroom curriculum, we hope to reach out to the education community and the public to inspire their curiosity and satisfy their interests in the study of comets. The highlights of activities during the past year included public and educational events that were associated with the CONTOUR launch in July.

**Contact:** Ms. Kathy May, Cornell University, Ithaca, NY 14853.

E-mail: [kathym@astrosun.astro.cornell.edu](mailto:kathym@astrosun.astro.cornell.edu). Phone: 607-255-8542.

**URL:** <http://www.contour2002.org/>

**Activities:** Comet Nucleus Tour (CONTOUR) Student Involvement [A260]  
 CONTOUR Public Lectures [A323]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Windows to the Universe [A245]

### B42. Dawn

**Description:** Dawn's goal is to characterize the conditions and processes of the Solar System's earliest epoch by investigating in detail two of the largest protoplanets remaining intact since their formations. Ceres and Vesta reside in the extensive zone between Mars and Jupiter, together with many other smaller bodies called the asteroid belt. Each has followed a very different evolutionary path constrained by the diversity of processes that operated during the first few million years of Solar System evolution. Dawn has much to offer the general public. It brings images of varied landscapes on previously unseen worlds to the public, including mountains; canyons; craters; lava flows; polar caps; and, possibly, ancient lakebeds, streambeds, and gullies. Students can follow the mission over an entire K-12 experience as the mission spacecraft is built, cruises to Vesta and Ceres, and returns data. The public will be able to participate through the Solar System Ambassadors and directly on the Web.

**Lead:** Dr. Lucy McFadden, University of Maryland, Astronomy Building, College Park, MD 20742.

E-mail: [McFadden@astro.umd.edu](mailto:McFadden@astro.umd.edu). Phone: 301-405-2081.

**URL:** <http://www-ssc.igpp.ucla.edu/dawn/outreach.html>

**Activities:** Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

**B43. Deep Impact**

**Description:** The Deep Impact mission outreach plan specializes in five audiences: educators, students, the general public (including informal outreach), underserved groups, and amateur astronomers.

**Lead:** Dr. Lucy McFadden, University of Maryland, Astronomy Building, College Park, MD 20742.  
E-mail: [McFadden@astro.umd.edu](mailto:McFadden@astro.umd.edu). Phone: 301-405-2081.

**Contact:** Ms. Maura Rountree-Brown, NASA Jet Propulsion Laboratory, Mail Stop 264-850, 4800 Oak Grove Drive, Pasadena, CA 91109.  
E-mail: [Maura.Rountree-Brown@jpl.nasa.gov](mailto:Maura.Rountree-Brown@jpl.nasa.gov). Phone: 818-393-4897.

**URL:** <http://deepimpact.jpl.nasa.gov>

**Activities:** Deep Impact Amateur Astronomer Partnership [A326]  
Deep Impact "Comet on a Stick!" [A79]  
Deep Impact Education: Student Support [A261]  
Deep Impact Educator Training [A152]  
Deep Impact Poster [A80]  
Deep Impact Public/Informal Events [A327]  
Deep Impact Science Poster [A81]  
Exploring Comets and Modeling for Mission Success [A85]  
From the Outer Planets to the Inner City [A49]  
From the Sun to the Star Nations [A50]  
Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
"Make a Comet Model and Eat It!" [A104]  
National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]  
Solar System Educator Program (SSEP) [A207]  
Windows to the Universe [A245]

**B44. Genesis**

**Description:** Genesis is a sample recovery mission designed to provide the data needed to achieve a better understanding of the original building blocks of the Solar System. The mission captures pieces of the Sun (ion by ion) in ultrapure materials. It will be returned to Earth in an airtight capsule, which will float toward the surface of the Earth via a parafoil. At an approximate altitude of 8,000-10,000 feet, it will be captured using a special technique with helicopters. These samples will be opened at the "cleanest" cleanroom in NASA at Johnson Space Center. From there, a small portion of the sample will be analyzed in new state-of-the-art facilities being built as part of this project. The remainder will be held and distributed over the remainder of the century to laboratories capable of making similar measurements. The education and public outreach of Genesis is also operated in a unique manner. The project has contracted with a Department of Education (DOE) Laboratory, McREL (Mid-Continent Research in Education and Learning). McREL, sited in Aurora, CO, has a lead role in DOE with respect to learning and standards-based education. So far, over the course of our mission, McREL has produced over 10 large educational modules (each composed of approximately 50-100 pages) of standards-based, field-tested materials. McREL has also designed and implemented an award winning Web page for the mission. Each month, this page gets in excess of 1 million hits, relating to over 45,000 visits, primarily by educators.

**Lead:** Dr. Gilbert Yanow, NASA Jet Propulsion Laboratory, Mail Stop 264-370, 4800 Oak Grove Drive, Pasadena, CA 91109.  
E-mail: [gilbert.yanow@jpl.nasa.gov](mailto:gilbert.yanow@jpl.nasa.gov). Phone: 818-354-8060.

**URL:** <http://genesismission.jpl.nasa.gov>

**Activities:** Genesis Chautauqua Program [A168]  
Genesis Classroom/Student Presentations [A266]  
Genesis Conference Workshops [A169]  
Genesis Education Events and Exhibits [A170]  
Genesis Products [A90]  
Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
National Convention for the National Science Teachers Association (NSTA) [A348]

Public Outreach [A353]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

#### **B45. Mercury Surface, Space Environment, Geochemistry and Ranging (MESSENGER)**

**Description:** MESSENGER is a scientific investigation of the planet Mercury. Understanding Mercury, and the forces that have shaped it, is fundamental to understanding the terrestrial planets and their evolution. MESSENGER is a mission to orbit Mercury, following two flybys of that planet. MESSENGER will investigate key scientific questions regarding Mercury's characteristics and environment during these two complementary mission phases. Data are provided by an optimized set of miniaturized space instruments and the spacecraft's telecommunications system. MESSENGER will enter Mercury orbit in April 2009 and will carry out comprehensive measurements for one Earth year. Data collection concludes in April 2010. Working in close coordination with the science team, a carefully selected group of education and public outreach (E/PO) professionals has been engaged to design a comprehensive set of activities that are coordinated with MESSENGER events to enliven education and to excite the public. These activities include teacher training, curriculum development, unique student investigations related to the mission and student experiments with MESSENGER, a television documentary, museum displays, and a special outreach to underserved and minority students. The full, multifaceted E/PO program is carried out with an extensive network of individual and institutional partners throughout the country. The E/PO effort is organized around overarching themes that reflect the science, engineering, technology, and people of the mission. The MESSENGER themes are Comparative Planetology, The Solar System Through History, and Framing Pathways to Answers: The Scientific Process in Action. The thematic framework is also informed by both content and pedagogy standards that are articulated in the National Science Education Standards and Benchmarks for Science Literacy. For the duration of the mission, the E/PO team will create and disseminate materials that focus on telling MESSENGER's many stories to a broad and diverse audience.

**Lead:** Ms. Stephanie Stockman, NASA Goddard Space Flight Center, Mail Code 921, Greenbelt, MD 20771.  
 E-mail: [stockman@core2.gsfc.nasa.gov](mailto:stockman@core2.gsfc.nasa.gov). Phone: 301-614-6457.

**URL:** <http://messenger.jhuapl.edu>

**Activities:** Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Windows to the Universe [A245]

#### **B46. Near-Earth Asteroid Rendezvous (NEAR)**

**Description:** As the first spacecraft to orbit (and land on!) an asteroid, the NEAR Shoemaker mission continues to answer fundamental questions about the nature and origin of near-Earth objects. These objects are of interest because they are the primary source of large bodies that collide with Earth, and because clues to the nature of early Solar System processes and conditions are preserved on primitive bodies like asteroids, comets, and meteorites. These clues have been altered or destroyed on large, planet-size bodies by processes of planetary evolution. (NEAR was launched on February 17, 1996; asteroid landing and final communication occurred on February 12, 2001.)

**Lead:** Ms. Kerri Beisser, Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099.  
 E-mail: [kerri.beisser@jhuapl.edu](mailto:kerri.beisser@jhuapl.edu). Phone: 443-778-6050.

**URL:** <http://near.jhuapl.edu/>

**Activities:** National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Near-Earth Asteroid Rendezvous (NEAR) Classroom Visits and Student Events [A284]  
 Near-Earth Asteroid Rendezvous (NEAR) Museum and Conference Exhibits and Support [A26]  
 Near-Earth Asteroid Rendezvous (NEAR) Special Interest Groups [A350]  
 Near-Earth Asteroid Rendezvous (NEAR) Student Events/Support [A285]  
 Near-Earth Asteroid Rendezvous (NEAR) Teacher Support [A190]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Science@NASA [A359]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Windows to the Universe [A245]

**B47. Stardust**

**Description:** The Stardust education Web page is designed to enhance the breadth, flexibility and knowledge of science, mathematics, and technology between K-12 education and higher education, recognizing and supporting a diverse set of programs while improving scientific literacy among students. The materials found on this home page are aligned with the national science education standards and have been designed primarily for use by grades 5-8. The Stardust education and public outreach team is composed of many partners which include the Challenger Center for Space Science Education; the JASON Foundation for Education; the Kirkpatrick Science and Air Space Museum at Omniplex; Space Explorers, Inc.; Virginia Space Grant Consortium; Parents and Children as Co-Travelers (PACCT); NASA Jet Propulsion Laboratory (JPL) Ambassadors Program; JPL Solar System Educator Program; From the Sun to the Star Nations—Native American Outreach Initiative; and Space Place. The Stardust mission participates and sponsors teacher training and curriculum development programs targeted for minorities and underserved communities along with the public at large. Other available resources include an interactive Web site, an education-based planetarium program, video animation, and library and museum exhibits.

**Lead:** Ms. Aimee Whalen, NASA Jet Propulsion Laboratory, Mail Stop 264-379, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [aimee.l.whelen@jpl.nasa.gov](mailto:aimee.l.whelen@jpl.nasa.gov). Phone: 818-354-3245.

**URL:** <http://stardust.jpl.nasa.gov>

**Activities:** From the Outer Planets to the Inner City [A49]  
 From the Sun to the Star Nations [A50]  
 Passport to the Solar System [A236]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Stardust Amateur Astronomical Societies [A372]  
 Stardust Conference Workshops [A136]  
 Stardust Formal Education [A211]  
 Stardust Informal Outreach [A29]  
 Stardust Public Outreach [A373]  
 Windows to the Universe [A245]

## Mars Exploration Program

**B48. Mars Public Engagement (Mars E/P0)**

**Description:** Mars exploration is NASA's signature effort in planetary science over the next two decades. It is one of the largest programs in NASA's Office of Space Science and will provide regular and frequent voyages to Mars. Such a compelling program deserves forward-looking initiatives to engage the public in Mars exploration, scientific discovery, and technological achievements. These initiatives are covered in a long-term Mars Public Engagement Plan.\* Just as Mars missions have been organized into a program where each element strategically complements and builds on another, the Mars Public Engagement Plan creates a focused, cohesive, highly leveraged program in its collection of planned activities. Mars public engagement is conducted at the program level, covering missions scheduled for Mars destinations over the next two decades.\*\* This organization prevents the need to reinvent the wheel with each mission; allows continuity in programming beyond the official end dates of the missions; and provides the ability to develop strong, stable, and common infrastructures with long-term partners. The benefit of a 20-year plan is that public engagement initiatives will have time to bear fruit. Also, the contributions and discoveries of each mission can be intimately linked to the rich and compelling science and technology goals of the Mars Exploration Program for greater public understanding of what NASA seeks to achieve in its systematic exploration of Mars. \*The term "public engagement" includes all formal education, informal education, and public information and outreach activities. \*\*Missions include Mariner 3-4, 6-7, and 8-9; Viking 1 and 2; Mars Pathfinder; Mars Global Surveyor; Mars Odyssey; Mars Exploration Rovers; United States participation in Mars Express; Mars Reconnaissance Orbiter; and Mars Science Laboratory. Missions also include coordination with Mars Netlander, Mars Scout, and other Mars programs that receive their education and public outreach funding from other sources.

**URL:** <http://mars.jpl.nasa.gov>

**Activities:** Exceptional Space Science Materials for Exceptional Students [A158]  
 "Exploring the Solar System" Teacher Workshops [A160]

From the Outer Planets to the Inner City [A49]  
 "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 "MarsQuest" Planetarium Show [A2]  
 "MarsQuest" Traveling Exhibit [A10]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Space Place Contributions to ITEA's "The Technology Teacher" [A369]  
 Space Science Workshops for Educators [A210]  
 Windows to the Universe [A245]

#### **B49. 2001 Mars Odyssey**

**Description:** The 2001 Mars Odyssey orbiter is mapping the mineralogy and morphology of the Martian surface, and it is achieving global mapping of the elemental composition of the surface and the abundance of hydrogen in the shallow subsurface. (The 2001 Mars Odyssey was launched on April 7, 2001, and arrived at Mars on October 24, 2001.)

**Lead** Ms. Christine Johnson, NASA Jet Propulsion Laboratory, Mail Stop 264-255, 4800 Oak Grove Drive, Pasadena, CA 91109.  
 E-mail: [Christine.Johnson@jpl.nasa.gov](mailto:Christine.Johnson@jpl.nasa.gov). Phone: 818-393-2634.

**URL:** <http://mars.jpl.nasa.gov/odyssey/>

**Activities:** From the Outer Planets to the Inner City [A49]  
 "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars Student Imaging Project Resource Manual [A107]  
 Mars Student Imaging Project Student Handbook and Activity Guide [A108]  
 Mars Student Imaging Project Teacher Guide [A109]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 "MarsQuest" Traveling Exhibit [A10]  
 Passport to the Solar System [A236]



Science Concepts in Context [A239]  
 Science@NASA [A359]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Space Science Workshops for Educators [A210]

### **B50. Mars Exploration Rover Mission (MER)**

**Description:** In 2003, two powerful new Mars rovers will be on their way to the Red Planet. With far greater mobility than the 1997 Mars Pathfinder rover, these robotic explorers will be able to trek up to 100 meters (about 110 yards) across the surface each Martian day. Each rover will carry a sophisticated set of instruments that will allow it to search for evidence of liquid water that may have been present in the planet's past. The rovers will be identical to each other but will land at different regions of Mars.

**URL:** <http://mars.jpl.nasa.gov/missions/future/2003.html>

**Activities:** "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 "MarsQuest" Traveling Exhibit [A10]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

### **B51. Mars Global Surveyor (MGS)**

**Description:** The Mars Global Surveyor is returning an unprecedented amount of data regarding the Martian surface features, atmosphere, and magnetic properties. Scientists are using the data gathered from this mission both to learn about the Earth by comparing it to Mars and to build a comprehensive data set to aid in planning future missions. (The Mars Global Survey was launched on November 7, 1996.)

**URL:** <http://mars.jpl.nasa.gov/mgs/>

**Activities:** "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 "Mapping the Surface of a Planet" Student Guide [A105]  
 "Mapping the Surface of a Planet" Teacher Guide [A106]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 "MarsQuest" Traveling Exhibit [A10]

Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Solar System Educator Program (SSEP) [A207]  
 Windows to the Universe [A245]

## **B52. Mars Pathfinder**

**Description:** Mars Pathfinder was launched on December 2, 1996, and arrived on the surface of Mars on July 4, 1997. The mission was an engineering demonstration of key technologies and concepts for use in future missions to Mars; it also delivered science instruments to the surface of Mars to investigate the structure of the Martian atmosphere, surface meteorology, surface geology, form and structure, and the elemental composition of Martian rocks and soil. A small, 10-kilogram (22-pound) rover was carried on the Pathfinder and became the first rover ever to explore the Martian surface. The last communication from the spacecraft was received on September 27, 1997, and it was officially declared dead on March 10, 1998.

**URL:** <http://mpfwww.jpl.nasa.gov/default.html>

**Activities:** "Live from Mars 2001" and "Live from Mars 2002" [A270]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]  
 Windows to the Universe [A245]

## **B53. Mars Reconnaissance Orbiter (MRO)**

**Description:** The Mars Reconnaissance Orbiter will focus on analyzing the surface at new scales in an effort to follow tantalizing hints of water detected in images from the Mars Global Surveyor spacecraft, and to bridge the gap between surface observations and measurements from orbit. For example, the Reconnaissance Orbiter will measure thousands of Martian landscapes at 20- to 30-centimeter (8- to 12-inch) resolution, good enough to observe rocks the size of beach balls.

**URL:** <http://mars.jpl.nasa.gov/missions/future/2005-plus.html>

**Activities:** Mars Reconnaissance Orbiter (MRO) Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) Events [A274]  
 Mars Robotics Education Partnership [A275]  
 Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]

**B54. Mars Science Laboratory (MSL)**

**Description:** The Mars Science Laboratory is a roving, long-range, long-duration science laboratory that will provide a major leap forward in surface measurements and will pave the way for a future sample-return mission. NASA is studying options to launch this mobile science laboratory mission as early as 2007. This capability will also demonstrate the technology for “smart landers” with accurate landing and hazard-avoidance abilities in order to reach what may be very promising but difficult-to-reach scientific sites.

**URL:** <http://solarsystem.nasa.gov/missions/profile.cfm?Sort=Chron&Mission=MarsSciLab>

**Activities:** Mars Robotics Education Partnership [A275]  
Mars Student Imaging Project [A276]  
Mars: Classroom Visits [A277]  
Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
Mars: Formal Educator Field Trips [A186]  
Mars: Formal Educator Workshops [A187]  
Mars: Imagine Mars! [A279]  
Mars: Informal Educator Workshops [A22]  
Mars: Models and Exhibits [A23]  
Mars: Museum Visualization Alliance [A24]  
Mars: Public Talks [A343]  
Mars: Public Tours [A344]  
Mars: Student Workshops [A280]

**B55. Mars Scout**

**Description:** The Mars Scout program is a set of 10 concepts that were selected for study in 2001. They include missions to return samples of Martian atmospheric dust and gas, networks of small landers, orbiting constellations of small craft, and a rover that would attempt to establish absolute surface ages of rocks and soils. NASA plans to evaluate the 10 innovative concepts using rapid 6-month studies as a means for jump-starting the identification of new Mars Scout missions that will compete for a possible launch in 2007.

**URL:** <http://www.jpl.nasa.gov/releases/2001/marsscout.html>

**Activities:** Mars Robotics Education Partnership [A275]  
Mars Student Imaging Project [A276]  
Mars: Classroom Visits [A277]  
Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
Mars: Formal Educator Field Trips [A186]  
Mars: Formal Educator Workshops [A187]  
Mars: Imagine Mars! [A279]  
Mars: Informal Educator Workshops [A22]  
Mars: Models and Exhibits [A23]  
Mars: Museum Visualization Alliance [A24]  
Mars: Public Talks [A343]  
Mars: Public Tours [A344]  
Mars: Student Workshops [A280]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]

**B56. Viking**

**Description:** NASA's Viking project found a place in history when it became the first mission to land spacecraft safely on the surface of another planet. Two identical spacecraft, each consisting of a lander and an orbiter, were built. Each orbiter-lander pair flew together and entered Mars orbit; the landers then separated and descended to the planet's surface. The Viking 1 Lander touched down on the western slope of Chryse Planitia (the Plains of Gold), while the Viking 2 Lander settled down at Utopia Planitia. Besides taking photographs and collecting other science data on the Martian surface, the two landers conducted three biology experiments designed to look for possible signs of life. These experiments discovered unexpected and enigmatic chemical activity in the Martian soil, but they provided no clear evidence for the presence of living microorganisms in the soil near the landing sites. According to scientists, Mars is self-sterilizing. They believe the combination of solar ultravi-

olet radiation that saturates the surface, the extreme dryness of the soil, and the oxidizing nature of the soil chemistry prevent the formation of living organisms in Martian soil. The Viking mission was planned to continue for 90 days after landing. Each orbiter and lander operated far beyond its designed lifetime. Viking Orbiter 1 functioned until July 25, 1978, while Viking Orbiter 2 continued for 4 years and 1,489 orbits of Mars, concluding its mission on August 7, 1980. Because of the variations in available sunlight, both landers were powered by radioisotope thermoelectric generators—devices that create electricity from heat given off by the natural decay of plutonium. That power source allowed long-term science investigations that otherwise would not have been possible. The last data from Viking 2 Lander arrived at Earth on April 11, 1980. Viking 1 Lander made its final transmission to Earth on November 11, 1982.

URL: <http://www.jpl.nasa.gov/missions/past/viking.html>

Activities: “Live from Mars 2001” and “Live from Mars 2002” [A270]

Mars Robotics Education Partnership [A275]

Mars Student Imaging Project [A276]

Mars: Classroom Visits [A277]

Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]

Mars: Formal Educator Field Trips [A186]

Mars: Formal Educator Workshops [A187]

Mars: Imagine Mars! [A279]

Mars: Informal Educator Workshops [A22]

Mars: Models and Exhibits [A23]

Mars: Museum Visualization Alliance [A24]

Mars: Public Talks [A343]

Mars: Public Tours [A344]

Mars: Student Workshops [A280]

Passport to the Solar System [A236]

Science Concepts in Context [A239]

## Outer Planets Program

### B57. Outer Planets/Education and Public Outreach Program (OP E/P0)

Description: The Outer Planets program consists of a roadmap of missions in search of organic-rich environments in the outer planetary regions of the Solar System. A refocusing of the Outer Planets program during the past year resulted in a concentration on the Europa Orbiter while the Pluto/Kuiper Belt Express mission was undergoing substantial revisions.

Lead: Mr. Richard Shope III, NASA Jet Propulsion Laboratory, Mail Stop 301-335, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [rick.shope@jpl.nasa.gov](mailto:rick.shope@jpl.nasa.gov). Phone: 818-354-3812.

Activities: Science Concepts in Context [A239]

Solar System Ambassadors Program [A363]

Solar System Ambassadors Training [A364]

Solar System Educator Program (SSEP) [A207]

### B58. Europa Orbiter

Description: The Europa education and public outreach effort embraces science and technology questions and invites participation as directly as possible in every aspect of the adventure of space exploration and discovery, creating activities and events organized around the following four active inquiry themes: Europa, An Ice Experience: Comparing Ices on Earth, Europa, and Other Worlds; Europa, An Ocean Experience: Searching for Evidence of an Ocean on Europa; Europa, A Planetary System Experience: Jupiter's Radiant Magnetosphere and Intense Gravitational Field; and Europa, An Organic-Rich Experience: Exploring a Potentially Organic-Rich World. Europa demonstrates leadership in reaching academically diverse learners through two programs working collaboratively with the Jet Propulsion Laboratory (JPL) and other NASA projects (including JPL's Stardust, Deep Impact, and the Deep Space Network; the Space Science Institute Broker/Facilitator; and the Sun-Earth Connection Forum at NASA Goddard) and in partnership with community-based organizations (LA's BEST, Project Universe, the World Hope Foundation, and the Academic Research Lab): From the Outer Planets to the Inner City, with an urban focus; and From the Sun to the Star Nations, with an American Indian focus. Europa's nationwide effort creates and implements validated outreach innovations for community and education services that achieve NASA objectives in response to participatory assessments of diverse audience needs.

Lead: Mr. Richard Shope III, NASA Jet Propulsion Laboratory, Mail Stop 301-335, 4800 Oak Grove Drive, Pasadena, CA 91109.  
E-mail: [rick.shope@jpl.nasa.gov](mailto:rick.shope@jpl.nasa.gov). Phone: 818-354-3812.

URL: <http://www.jpl.nasa.gov/europaorbiter/>

Activities: "Europa: An Ice Experience" Educator Workshops [A156]  
From the Outer Planets to the Inner City [A49]  
From the Sun to the Star Nations [A50]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]  
Solar System Educator Program (SSEP) [A207]

## Other NASA Programs

### B59. Astromaterials Program (Astromaterials)

Description: The Astromaterials program at NASA Johnson Space Center (JSC) curates and distributes samples of other bodies in the Solar System to researchers around the world. Astromaterials include samples collected by NASA missions (Apollo Moon rocks, Genesis solar wind ions, and Stardust comet particles) and samples collected from Earth (meteorites from Antarctica and cosmic dust from the stratosphere). Astromaterials education and public outreach (E/PO) focus on the scientific study of extraterrestrial materials and their use in education. The program is based on collaboration between scientists at JSC and educators. A long-term example is the distribution of lunar and meteorite samples to schools through partnership with the NASA Education Office. Major recent projects include 1) the development of classroom activities in partnership with K-12 teachers and the presentation of these activities in teacher workshops, 2) the collaboration with two minority universities on a Houston-wide outreach program, and 3) the development of exhibits and planetarium shows in partnership with museums.

Lead: Dr. Marilyn Lindstrom, NASA Johnson Space Center, 2101 NASA Road 1, Houston, TX 77058.  
E-mail: [marilyn.m.lindstrom1@jsc.nasa.gov](mailto:marilyn.m.lindstrom1@jsc.nasa.gov). Phone: 281-483-5135.

URL: <http://curator.jsc.nasa.gov>

Activities: Astromaterials Sample Distribution [A143]  
Astromaterials-Astrobiology Student Presentations [A257]  
"Exploring the Solar System" Teacher Workshops [A160]  
"Fingerprints of Life?"—Development of Classroom Activities, Web Site, and CD-ROM [A232]  
Formal and Informal Education Workshops with an Astrobiology Component [A164]  
Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
Rocks from Space in the Classroom [A238]  
"Rocks from Space" Teacher Workshops [A199]

### B60. Deep Space Mission System (DSMS)

Description: DSMS incorporates the Deep Space Network (DSN) and the infrastructure, software, and systems which support it. The goal of the education and public outreach program for DSMS is to build awareness of the critical role that communication plays in Solar System exploration. Without a means of communicating between spacecraft and Earth to relay commands and return science data, there could be no exploration. Using the DSMS, frequent collaborations with the Jet Propulsion Laboratory (JPL) missions tell this story, while previously produced printed materials and videos are distributed to educators and to the public to offer further explanation. DSMS partners with JPL programs (Solar System Ambassadors, Solar System Educators, and a Native American initiative), allowing wider distribution of information and educational activities. The DSN is also used for science observation through radio astronomy, and one of the decommissioned, 34-meter antennas is now part of an innovative educational program, the Goldstone Apple Valley Radio Telescope (GAVRT). Students control this huge antenna, via the Internet, from their classrooms to gather and analyze data which are ultimately used by scientists at JPL.

Lead: Ms. Shirley Wolff, NASA Jet Propulsion Laboratory, Mail Stop 303-401, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [shirley.e.wolff@jpl.nasa.gov](mailto:shirley.e.wolff@jpl.nasa.gov). Phone: 818-354-4069.

URL: <http://deepspace.jpl.nasa.gov/dsn>

Activities: Deep Space Network Formal Education [A153]



Deep Space Network Informal Education [A328]  
 Deep Space Network Public Events [A329]  
 From the Outer Planets to the Inner City [A49]  
 From the Sun to the Star Nations [A50]  
 GAVRT Classroom Implementation [A264]  
 GAVRT Educational Conference Workshops and Exhibits [A166]  
 GAVRT Scientist Telecons [A265]  
 GAVRT Teacher Training [A167]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Goldstone Communications Complex—Public Tours [A333]  
 Goldstone Communications Complex—Student Tours [A267]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

### **B61. Deep Space 1 [New Millennium] (DS-1)**

**Description:** “The Space Place” has involved DS-1 in the following events/activities: We attend conferences to promote “The Space Place” and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos, and aquariums in the United States have formed Club Space Place partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships, we promote “The Space Place” Web site and the NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly, interdisciplinary, hands-on activities that are related to space or Earth science. These quarterly activities go to Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in English and Spanish. The combined readership for that one day a month adds up to more than 2.5 million. The articles always end with information on activities, a link to “The Space Place” Web site, and links to mission Web sites. Diane Fisher submits articles to the “Technology and Children” magazine four times a year and articles to “The Technology Teacher” magazine eight times a year. Each article, published under a Space Place header, refers to a particular mission. Each “Technology and Children” publication reaches an estimated 1,400 teachers and their students (up to 42,000 children), and each “The Technology Teacher” publication reaches an estimated 8,000 teachers and their students (up to 224,000 children). Articles are also posted on ITEA’s Web site which reaches an even wider audience. “The Space Place” Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. “The Space Place” is supported by the New Millennium program. It reaches an average of 3,000 viewers a day.

**Lead:** Ms. Nancy Leon, NASA Jet Propulsion Laboratory, Mail Stop 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

**URL:** <http://spaceplace.jpl.nasa.gov/>

**Activities:** From the Outer Planets to the Inner City [A49]  
 Girl Scouts of the USA (GSUSA)/NASA OSS Partnership [A51]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Space Place Contributions to ITEA’s “Technology and Children” [A368]  
 Windows to the Universe [A245]

### **B62. Near-Earth Asteroid Tracking (NEAT)**

**Description:** NEAT is an autonomous celestial observatory developed by the Jet Propulsion Laboratory and funded by the National Aeronautics and Space Administration to study asteroids and comets. The NEAT Principal Investigator is Dr. Eleanor F. Helin, with co-investigators Dr. Steven H. Pravdo (also the project manager), and Dr. David Rabinowitz (now of Yale University). Discoveries are reported to the Minor Planet Center, whose Web site contains new objects which require confirmation by observers.

**URL:** <http://neat.jpl.nasa.gov/>

**Activities:** Solar System Ambassadors Program [A363]  
 Solar System Ambassadors Training [A364]

## International Missions with NASA Participation

### B63. Mars Express

**Description:** NASA is participating in a mission called Mars Express that was planned by the European Space Agency and the Italian Space Agency. This mission will explore the atmosphere and surface of Mars from polar orbit. NASA's involvement includes joint development of the radar instrument with the Italian Space Agency, support of U.S. science co-investigators, coordination of radio relay systems to make sure that different spacecraft will operate with each other, a hardware contribution to the energetic neutral atoms analyzer instrument, and the provision of backup tracking support during critical mission phases by NASA's Deep Space Network. Our contribution to the energetic neutral atoms analyzer instrument is called ASPERA-3. ASPERA-3 was selected as a Discovery mission of opportunity; the complete instrument will study the interaction between the solar wind and the atmosphere of Mars, and it will attempt to find out what happened to the large amount of water that was once on Mars. The co-investigator being funded by NASA is Dr. David Winningham of the Southwest Research Institute, San Antonio, TX.

**URL:** <http://mars.jpl.nasa.gov/missions/future/express.html>

**Activities:** Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]  
 "MarsQuest" Traveling Exhibit [A10]

### B64. Mars NetLander

**Description:** A U.S. contribution to the French-led NetLander mission will add unique capabilities to each of the four landers and the orbiter which compose the mission. In 2007, NetLander will create the first science network on Mars to study the planet's internal structure. The American contribution includes short-period seismometers and wind sensors on the landers and a high-resolution geodesy instrument on the orbiter. NetLander was selected in January 2001 as a Discovery Mission of Opportunity.

**URL:** <http://www.geo.fmi.fi/PLANETS/NetLander.html>

**Activities:** Mars Student Imaging Project [A276]  
 Mars: Classroom Visits [A277]  
 Mars: For Inspiration and Recognition of Science and Technology (FIRST) Robotics Participation [A278]  
 Mars: Formal Educator Field Trips [A186]  
 Mars: Formal Educator Workshops [A187]  
 Mars: Imagine Mars! [A279]  
 Mars: Informal Educator Workshops [A22]  
 Mars: Models and Exhibits [A23]  
 Mars: Museum Visualization Alliance [A24]  
 Mars: Public Talks [A343]  
 Mars: Public Tours [A344]  
 Mars: Student Workshops [A280]

### B65. Rosetta

**Description:** Rosetta is a European Space Agency cometary mission. The satellite will rendezvous with a comet and orbit it, while taking scientific measurements. A Surface Science Package (SSP) will be landed on the comet's surface to take in situ measurements. The United States is providing science instruments for the orbiter.

**URL:** <http://sci.esa.int/home/rosetta/index.cfm>

**Activities:** Science Concepts in Context [A239]  
 Windows to the Universe [A245]

## STRUCTURE AND EVOLUTION OF THE UNIVERSE (SEU) MISSIONS

### Major Missions

#### B66. Advanced Radio Interferometry between Space and Earth (ARISE)

**Description:** ARISE will be a mission consisting of one (or possibly two) 25-meter radio telescopes in highly elliptical Earth orbit. The telescope(s) would observe the Universe in conjunction with a large number of radio telescopes on the ground, using the technique of space Very Long Baseline Interferometry (VLBI) in order to obtain the highest resolution (10-microarcsecond) images of the most energetic astronomical phenomena in the Universe.

**URL:** <http://arise.jpl.nasa.gov/>

**Activities:** GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

#### B67. Chandra X-Ray Observatory (CXO)

**Description:** The Chandra X-Ray Observatory, the third of NASA's great observatories, was launched in July 1999 and has completed its third year of science operations. Chandra has returned spectacular images of the x-ray emission from such energetic cosmic sources as the material swirling into black holes, exploding stars, and long jets of high-energy particles. The goals of the Chandra education and public outreach (E/PO) program are to increase public engagement with NASA's Space Science Enterprise by conveying the excitement of the Chandra discoveries to the public; promote science literacy by engaging the imaginations of students, educators, and the public; increase learning opportunities in science, mathematics, and technology with classroom-ready materials that are aligned with national standards; and to provide ready access to Chandra images and education products by utilizing a wide range of technologies and formats for accessibility. The program maintains an extensive public Web site with all images, background materials, and education products that are downloadable in multiple formats. Online forms allow educators to order printed and multimedia resources. Opportunities for educators include summer workshops and the Chandra Teacher Resource Agent program. Printed material such as posters, bookmarks, lithographs, a coloring book, and postcards are available for classroom and informal education use. A CD-ROM, containing Chandra images, has been distributed widely to classrooms, planetariums, and amateur astronomy associations. Classroom-ready materials are downloadable from the E/PO Web site on such topics as the electromagnetic spectrum and the life cycle of stars. For greater educational impact, an effort is made to present Chandra images in multiwavelength comparisons. The newest addition to the Chandra education materials is a software program, tailored for educational use, that combines the ability to display images with a pull-down menu of x-ray analysis tools, enabling students and teachers to work with actual Chandra data and images.

**Lead:** Ms. Kathleen Lestition, Chandra X-Ray Center, 60 Garden Street, Cambridge, MA 02138.

E-mail: [klestition@cfa.harvard.edu](mailto:klestition@cfa.harvard.edu). Phone: 617-495-7399.

**URL:** <http://chandra.harvard.edu>

**Activities:** "Bright Cosmic Lights of the Milky Way" [A70]  
Chandra Images CD-ROM [A76]  
Chandra Public Outreach by the Massachusetts Institute of Technology (MIT) Center for Space Research (CSR) [A316]  
Chandra Summer Lecture Series at the Massachusetts Institute of Technology (MIT) Center for Space Research (CSR) [A317]  
Chandra X-Ray Center Online Education and Outreach [A318]  
Chandra X-Ray Center Operation Control Center Tours [A319]  
Chandra X-Ray Center Presentations [A259]  
Chandra X-Ray Center Public Outreach [A320]  
Chandra X-Ray Center Teacher Workshops and Presentations [A148]  
Collision Processes in Astrophysical Plasmas [A35]  
Cosmic Journeys Collectible Card Game [A78]  
"Cosmic Questions" Interpretation/Docent Activities [A15]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
"Galaxy Clusters X-Ray and Optical Light" [A88]  
GLAST High-Energy Informal Education [A17]  
High-Energy Classroom Teacher Workshops [A172]  
"Journey to the Edge of Space and Time" Planetarium Show [A1]  
MicroObservatory Online Telescopes [A281]

National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 National Convention for the National Science Teachers Association (NSTA) [A348]  
 Presentations by the Massachusetts Institute of Technology (MIT) Center for Space Research [A287]  
 Science Concepts in Context [A239]  
 Science@NASA [A359]  
 "Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
 "Seeing the Universe in a Whole New Light" [A123]  
 Smithsonian Teacher's Night [A206]  
 Space Place Newspaper Contributions [A371]  
 Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
 Swift High-Energy Informal Education [A31]  
 "Waves Light Up The Universe!" Teacher Workshops [A229]

---

#### **B68. Compton Gamma-Ray Observatory (CGRO)**

**Description:** CGRO, the second of NASA's great observatories, was launched on April 5, 1991. It had a diverse scientific agenda, including studies of very energetic celestial phenomena: solar flares, cosmic gamma-ray bursts, pulsars, nova and supernova explosions, accreting black holes of stellar dimensions, quasar emission, and interactions of cosmic rays with the interstellar medium. Compton left a legacy of outstanding science and revolutionized our knowledge of the gamma-ray sky. Its mission ended on June 4, 2000, when it was de-orbited following the failure of one of its three gyroscopes.

**URL:** <http://cossc.gsfc.nasa.gov/cossc/>

**Activities:** Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]  
 Science Concepts in Context [A239]

---

#### **B69. Constellation-X (Con-X)**

**Description:** Constellation-X has been designed to perform x-ray spectroscopy with unprecedented sensitivity and spectral resolution. The measurement of large numbers of x-ray spectral lines in hot plasmas leads to determining the elemental composition, temperature, and velocity of the emitting matter. Astronomers will determine the flow of gas in accretion disks around black holes in active galactic nuclei and in binary x-ray sources, measure the population of newly created elements in supernova remnants, and detect the influence of dark matter on the hot intergalactic medium in clusters of galaxies. Constellation-X is identified in the Office of Space Science Strategic Plan.

**URL:** <http://constellation.gsfc.nasa.gov/>

**Activities:** Cosmic Journeys Collectible Card Game [A78]  
 GLAST High-Energy Informal Education [A17]  
 "Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
 Swift High-Energy Informal Education [A31]

---

#### **B70. Gamma-ray Large Area Space Telescope (GLAST)**

**Description:** GLAST is scheduled for launch in September of 2006. With GLAST, scientists seek to explore the limits of gravity and energy in the Universe and to study nature's highest energy acceleration processes. The instruments aboard GLAST have an imaging gamma-ray telescope vastly more capable than instruments flown previously as well as a secondary instrument to augment the study of gamma-ray bursts. The GLAST education and public outreach (E/PO) group has developed a program that is well suited to promote inquiry into the origin and structure of the Universe and the fundamental relationship between energy and matter, concepts which are included in the Physical Science Content Standards A, B, and D for grades 9-12. The GLAST Telescope Network (GTN) is being designed to provide information to ground-based, gamma-ray telescopes for more detailed observations of events that produce gamma rays. GTN also will promote the development of an imaging and data archive. The GLAST Ambassador Program consists of 10 educators who will work in conjunction with GLAST science and E/PO team members at Sonoma State University and the Stanford Linear Accelerator (SLAC) to develop workshops and curricular materials. Many printed materials are being developed, including TOPS lesson modules and yearly posters and activity sets. Ask A Scientist allows students, teachers, and the public to ask and receive answers about GLAST high-energy physics. The GLAST E/PO group also maintains a public-oriented Web site. Among future programs are an interactive gamma-ray detector exhibit (under development at the Stanford Linear Accelerator's Virtual Visitor Center) and more Space Mysteries (interactive video games that teach physical science and mathematics). Also in development with Thomas Lucas Productions is a NOVA or PBS special that takes a sweeping look at high-energy astrophysics.

Lead: Dr. Lynn Cominsky, Sonoma State University, Department of Physics and Astronomy, 1801 East Cotati Avenue, Rohnert Park, CA 94928.  
E-mail: [lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu). Phone: 707-664-2655.

URL: <http://glast.gsfc.nasa.gov>

Activities: Chandra X-Ray Center Teacher Workshops and Presentations [A148]  
Cosmic Journeys Collectible Card Game [A78]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
Examining Einstein's Spacetime with Gravity Probe B [A157]  
"Exploring the Extreme Universe!" Student Presentations [A262]  
GLAST High-Energy Informal Education [A17]  
High-Energy Classroom Teacher Workshops [A172]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]  
"The Exploding Universe" Public Presentations [A383]  
The Extreme Universe of Gamma-Ray Astronomy! Public Presentations [A384]  
"Waves Light Up The Universe!" Teacher Workshops [A229]

### **B71. Gravity Probe B Relativity Mission (GP-B)**

Description: Gravity Probe B is producing and distributing educational materials that communicate the science and technology of GP-B, including Einstein's General Theory of Relativity. In addition, GP-B is participating in conferences and workshops to teach students, teachers, and the general public about GP-B. Materials include posters, an educator guide, lithograph sets, a DVD video, and brochures. Most materials are available on the GP-B Web site. Additionally, the GP-B Web site is developing a spacetime and relativity section to introduce and educate users about these concepts.

Lead: Ms. Shannon Range, Stanford University, HEPL 4085, Stanford, CA 94305. E-mail: [www@relgyro.stanford.edu](mailto:www@relgyro.stanford.edu).

Contact: Dr. Jennifer Mullins, Stanford University, HEPL 4085, Stanford, CA 94305. E-mail: [www@relgyro.stanford.edu](mailto:www@relgyro.stanford.edu).

URL: <http://einstein.stanford.edu>

Activities: "Cosmic Questions" Interpretation/Docent Activities [A15]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
Examining Einstein's Spacetime with Gravity Probe B [A157]  
GLAST High-Energy Informal Education [A17]  
Gravity Probe B Classroom Lithograph Set [A91]  
Gravity Probe B Wallsheet [A92]  
Gravity Probe B: "Examining Einstein's Spacetime with Gyroscopes" Educator's Guide [A93]  
High-Energy Classroom Teacher Workshops [A172]  
Science@NASA [A359]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]

### **B72. Laser Interferometer Space Antenna (LISA)**

Description: Space Place has involved LISA in the following events/activities: We attend conferences to promote "The Space Place" and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos, and aquariums in the United States have formed Club Space Place partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships, we promote "The Space Place" Web site and the NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly, interdisciplinary, hands-on activities that are related to space or Earth science. These quarterly activities go to Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in English and Spanish. The combined readership for that 1 day a month adds up to more than 2.5 million. The articles always end with information on activities, a link to "The Space Place" Web site, and links to mission Web sites. Diane Fisher submits articles to the "Technology and Children" magazine four times a year and to "The Technology Teacher" magazine eight times a year. Each article, published under a Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches up to an estimated 1,400 teachers and their students (up to 42,000 children), and each "The



Technology Teacher" publication reaches an estimated 8,000 teachers and their students (up to 224,000 children). Articles are also posted on ITEA's Web site which reaches an even wider audience. "The Space Place" Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. "The Space Place" is supported by the New Millennium program. It reaches an average of 3,000 viewers a day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, Mail Stop 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.jpl.nasa.gov>

Activities: Catch a Gravitational Wave, Dude! [A73]  
Cosmic Journeys Collectible Card Game [A78]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
GLAST High-Energy Informal Education [A17]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Space Place Contributions to ITEA's "Technology and Children" [A368]  
Space Place Contributions to ITEA's "The Technology Teacher" [A369]  
Space Place Newspaper Contributions [A371]  
Swift High-Energy Informal Education [A31]

## Explorers

### B73. Cooperative Astrophysics and Technology Satellite (CATSAT)

Description: The scientific objectives of CATSAT is to study the origin and nature Gamma-Ray bursters, one of the most mysterious astrophysical phenomenon. CATSAT is a small, ongoing scientific satellite mission being developed by the University of New Hampshire through the Universities Space Research Association (USRA)/NASA Student Explorer Demonstration Initiative (STEDI) program.

URL: <http://www.catsat.sr.unh.edu/>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

### B74. Cosmic Background Explorer (COBE)

Description: The COBE satellite was developed to measure the diffuse infrared and microwave radiation from the early Universe, to the limits set by our astrophysical environment. It was launched on November 18, 1989, and carried three instruments, a Far Infrared Absolute Spectrophotometer (FIRAS) to compare the spectrum of the cosmic microwave background radiation with a precise black body, a Differential Microwave Radiometer (DMR) to map the cosmic radiation precisely, and a Diffuse Infrared Background Experiment (DIRBE) to search for the cosmic infrared background radiation. The cosmic microwave background spectrum was measured with a precision of 0.005 percent; the results confirmed the Big Bang theory of the origin of the Universe.

URL: <http://nssdc.gsfc.nasa.gov/database/MasterCatalog?sc=1989-089A>

Activities: "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
Science Concepts in Context [A239]

### B75. Cosmic Hot Interstellar Plasma Spectrometer (CHIPS)

Description: CHIPS will use an extreme ultraviolet spectrograph during its 1-year mission to study the "Local Bubble," a tenuous cloud of hot gas surrounding our Solar System that extends about 300 light-years from the Sun. Scientists believe that the million-degree gas in this region is generated by supernovas and stellar winds from hot stars, but they want to better understand the origins and cooling of this gas and apply knowledge of these processes to the study of other galaxies beyond our Milky Way. CHIPS was selected in September 1998 as one of the first two University-Class Explorer (UNEX) missions. (CHIPS was launched on January 12, 2003.)

Lead: Dr. Nahide Craig, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.

E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

URL: <http://chips.ssl.berkeley.edu/chips.html>

Activities: Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) Formal Education Teacher Inservice Preparation [A150]  
Cosmic Hot Interstellar Plasma Spectrometer (CHIPS) Public Outreach and Informal Education [A325]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
GLAST High-Energy Informal Education [A17]  
High-Energy Classroom Teacher Workshops [A172]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]

**B76. Extreme Ultraviolet Explorer (EUVE)**

Description: EUVE was an astronomy mission operating in the largely unexplored extreme ultraviolet (70–760 Å) band. The science payload consisted of three grazing incidence scanning telescopes and an extreme ultraviolet (EUV) spectrometer/deep survey instrument. The spacecraft was launched on June 7, 1992, and was completely successful, exceeding its science goals. EUVE was turned off on January 31, 2001.

URL: <http://ssl.berkeley.edu/euve/>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

**B77. Galaxy Evolution Explorer (GALEX)**

Description: Space Place has involved GALEX in the following events/activities: We attend conferences to promote “The Space Place” and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos, and aquariums in the United States have formed Club Space Place partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships, we promote “The Space Place” Web site and the NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly, interdisciplinary, hands-on activities that are related to space or Earth science. These quarterly activities go to Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in English and Spanish. The combined readership for that 1 day a month adds up to more than 2.5 million. The articles always end with information on activities, a link to “The Space Place” Web site, and links to mission Web sites. Diane Fisher submits articles to the “Technology and Children” magazine four times a year and to “The Technology Teacher” magazine eight times a year. Each article, published under a Space Place header, refers to a particular mission. Each “Technology and Children” publication reaches up to an estimated 1,400 teachers and their students (up to 42,000 children), and each “The Technology Teacher” publication reaches an estimated 8,000 teachers and their students (up to 224,000 children). Articles are also posted on ITEA’s Web site, which reaches an even wider audience. “The Space Place” Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. “The Space Place” is supported by the New Millennium program. It reaches an average of 3,000 viewers a day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, Mail Stop 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.jpl.nasa.gov>

Activities: Galaxy Evolution Explorer (GALEX) Social [A332]  
GLAST High-Energy Informal Education [A17]  
“Seeing and Exploring the Universe Resource Guide” (2002) [A122]  
Swift High-Energy Informal Education [A31]

**B78. High Energy Transient Explorer 2 (HETE-2)**

Description: HETE-2’s prime objective is to carry out a multiwavelength study of gamma-ray bursts (GRBs) with ultraviolet, x-ray, and gamma-ray instruments. A unique feature of the mission is its capability to localize bursts with several arcsecond accuracy, in near real-time, aboard the spacecraft. The original HETE spacecraft was lost as a result of a launch failure on November 4, 1996. (HETE-2 was launched on October 9, 2000.)

Lead: Dr. Irene Porro, Massachusetts Institute of Technology, NE80-6079, 77 Massachusetts Avenue, Cambridge, MA 02139.

E-mail: [iporro@space.mit.edu](mailto:iporro@space.mit.edu). Phone: 617-258-7481.

URL: <http://space.mit.edu/HETE/>

Activities: Chandra Public Outreach by the Massachusetts Institute of Technology (MIT) Center for Space Research (CSR) [A316]  
“Cosmic Questions: Our Place in Space and Time” Traveling Exhibition [A5]  
GLAST High-Energy Informal Education [A17]  
“Seeing and Exploring the Universe Resource Guide” (2002) [A122]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]

**B79. Microwave Anisotropy Probe (MAP)**

**Description:** MAP continues to concentrate its education and public outreach (E/PO) efforts in electronic forms. MAP's mission page and the "Teacher's Guide to the Universe" Web site explain both the basics about cosmology as well as mission details. Additionally, MAP has supported the Structure and Evolution of the Universe (SEU) Forum's creation of the "Cosmic Questions" exhibit and the Space Science Update kiosk. MAP has created four postcards for E/PO and has helped to create a mission card for the Cosmic Journeys card game. MAP has been represented at national and State conferences by education staff, and it has contributed to SEU Forum kits. MAP's E/PO coordinator has led a course for an informal audience at a local planetarium. MAP continues to work with the Cooperative Satellite Learning Program and Old Bridge High School.

**Lead:** Dr. David Spergel, Princeton University, Peyton Hall, Dept. of Astrophysics, Princeton, NJ 08544-1001.  
E-mail: [dns@astro.princeton.edu](mailto:dns@astro.princeton.edu). Phone: 609-258-3589.

**Contact:** Ms. Lindsay Bartolone, Adler Planetarium and Astronomy Museum, Education, 1300 S. Lake Shore Drive, Chicago, IL 60605.

E-mail: [Lindsay\\_Clark@adlernet.org](mailto:Lindsay_Clark@adlernet.org). Phone: 312-322-0316.

**URL:** <http://www.astro.princeton.edu/~clark/teachersguide.html>

**Activities:** "A Teacher's Guide to the Universe" MAP Workshop [A140]  
Cosmic Journeys Collectible Card Game [A78]  
"Cosmic Questions" Interpretation/Docent Activities [A15]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
"Does the Universe Have a Fingerprint?" Factcard [A83]  
GLAST High-Energy Informal Education [A17]  
"Greetings from L2" Factcard [A94]  
MAP Cooperative Satellite Learning Project (CSLP) [A273]  
Mapping the Cosmic Microwave Background—Microwave Anisotropy Probe (MAP) Informal Outreach [A342]  
"Microwaves in Space?" Factcard [A110]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
"Should This Laser Slinging Slug Have Fired His Weapon?" Factcard [A124]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]  
York College Observatory Educational Outreach Program (YCOOP) [A46]

**B80. Rossi X-ray Timing Explorer (RXTE)**

**Description:** RXTE, launched in December 1995, continues to return a stream of impressive results on the physics of matter near sources of extreme gravity (neutron stars, black holes, and the supermassive black hole cores of active galaxies). The mission, a collaboration among NASA Goddard Space Flight Center, the Massachusetts Institute of Technology (MIT), and the University of California, San Diego, centers on three flight instruments in a low-Earth orbit which investigate the 2-250 keV x-ray spectral and milliseconds-to-years timing variability of astronomical sources. Since early in the mission, RXTE has supported an active education and public outreach (E/PO) program involving the RXTE Learning Center—an online educational resource for teachers and students. It hosts teacher interns who design and develop lesson plans and classroom activities based on RXTE results. Recent accomplishments include the All-Sky Monitor-based Tour the X-Ray Sky, which uses real data to introduce students to the types of variability seen in x-ray sources, and a series of supporting educator workshops to train teachers on the use of this module in their classrooms. During the next two years, the E/PO program for RXTE will focus on the classroom testing and educator dissemination of a collection of newly developed activities to go with a multimedia RXTE product—"The High Energy Groovie Movie." This movie mates an animation of the x-ray variability of the entire sky over several years of the mission (developed by the All-Sky Monitor team at MIT) with a high-energy original pop song, "High Energy Groove" (written and recorded by the Chromatics as part of the AstroCappella project), which describes the basics of modern x-ray astronomy. The activities were developed by two Maryland teacher interns in the summer of 2002 and cover a range of topics, including the technology behind the Proportional Counter Array (PCA) detectors, how accretion works in close binary systems, neutron stars and pulsars, active galaxies, and the electromagnetic spectrum.

**Lead:** Dr. Patricia Boyd, NASA Goddard Space Flight Center, Mail Code 662, Greenbelt, MD 20771.

E-mail: [padi@lhea1.gsfc.nasa.gov](mailto:padi@lhea1.gsfc.nasa.gov). Phone: 301-286-2550.

**URL:** [http://rxte.gsfc.nasa.gov/docs/xte/learning\\_center/](http://rxte.gsfc.nasa.gov/docs/xte/learning_center/)

**Activities:** Chandra Public Outreach by the Massachusetts Institute of Technology (MIT)  
Center for Space Research (CSR) [A316]

GLAST High-Energy Informal Education [A17]  
 "Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
 Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
 Swift High-Energy Informal Education [A31]

### **B81. Spectroscopy and Photometry of the IGMs Diffuse Radiation (SPIDR)**

**Description:** The SPIDR mission is designed to detect, map, and quantify the cosmic web of hot, intergalactic filaments that were predicted by hydrodynamic models of the structure of the Universe. In addition, SPIDR will provide new information about hot gas in a variety of galactic environments. SPIDR will provide these diagnostics through the spectral imaging of selected astrophysical fields in the 100-150 nm band. The SPIDR education and public outreach program will include a new GEMS educator guide with a Cosmic Models theme for grades 6-8. It will highlight key concepts of the SPIDR mission's scientific work and will inform students of the mission's goals. Students will create models to visualize our galaxy, our Local group, galaxies in the Virgo cluster, and clusters of galaxies. The activities in this GEMS guide will use models and visualization that go beyond the scale of the planetary system models that were developed in previous GEMS guides. (The SPIDR mission deals with structure on the largest scale.) A GEMS training center will be launched at the New Mexico Museum of Natural History and Science (NMMNHS) to establish close working relationships with education leaders at the NMMNHS and the Albuquerque and Santa Fe public schools. SPIDR science will be included in a series of new presentations to be developed by the Boston Museum of Science's Current Science and Technology Center and in a series of Web programs to be developed by the NASA Marshall Space Flight Center for the following Web sites: "Science@NASA," "NASAKids," "Liftoff," and the Spanish-language Web site "Ciencia@NASA." SPIDR will partner with the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE), one of the first such partnerships between a mission and this professional society. The organization's undergraduate students will produce a series of biographical and professional profiles of NOBCChE scientists. SPIDR scientists will also participate in annual NOBCChE conferences and their professional teacher workshops.

**Lead:** Dr. Nahide Craig, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.  
 E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

**Contact:** Dr. Bryan Mendez, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.  
 E-mail: [bmendez@ssl.berkeley.edu](mailto:bmendez@ssl.berkeley.edu). Phone: 510-643-2178.

**URL:** <http://www.bu.edu/spidr/indextoo.html>

**Activities:** "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
 "Journey to the Edge of Space and Time" Planetarium Show [A1]  
 Professional Societies of Minority Scientists/OSS Collaboration [A57]

### **B82. Submillimeter Wave Astronomy Satellite (SWAS)**

**Description:** SWAS is part of the Small Explorer program. SWAS studies the chemical composition, energy balance, and structure of interstellar clouds and the processes that lead to the formation of stars and planets. SWAS was launched on December 5, 1998.

**URL:** <http://cfa-www.harvard.edu/swas/>

**Activities:** GLAST High-Energy Informal Education [A17]  
 "Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
 Swift High-Energy Informal Education [A31]

### **B83. Swift Gamma-Ray Burst MIDEX Mission (Swift)**

**Description:** Swift is a NASA Medium-class Explorer (MIDEX) mission being developed for launch in September 2003 by an international collaboration. Swift is the first of its kind, a multiwavelength observatory that is dedicated to the study of gamma-ray bursts. The main mission objectives of Swift include determining the origin of gamma-ray bursts, classifying gamma-ray bursts as well as searching for new types, determining how the blast wave evolves and interacts with the surroundings, using gamma-ray bursts to study the early Universe, and performing a sensitive survey of the sky in the hard x-ray band. Swift has a complement of three coaligned instruments: the BAT, XRT, and UVOT. Using this prompt burst location information, Swift can slew quickly to point onboard x-ray (XRT) and optical (UVOT) instrumentation at the burst for continued afterglow studies. The goal of the Swift mission education and public outreach (E/PO) efforts at Sonoma State University is to use the observations and scientific discoveries of the Swift mission to improve the understanding and utilization of science and mathematics concepts for grades 7-12. Swift E/PO team members interact with and disseminate Swift curricular materials via workshops and conferences at the national, State, and local levels. The program



includes yearly posters and activity sets and a GEMS guide, entitled "Invisible Universe," that has been developed at the Lawrence Hall of Science and will be available in the fall of 2002. "What's In The News?," a television show produced by Pennsylvania State University, informs middle school students across the country about Swift. Pennsylvania State University also offers yearly workshops for science educators: In the summer of 2002, Swift was featured in a space astronomy workshop. Evaluation and guidance of the development of educational materials comes from the Swift Education Committee (SwEC) and the two Swift Educator Ambassadors.

**Lead:** Dr. Lynn Cominsky, Sonoma State University, Department of Physics and Astronomy, 1801 East Cotati Avenue, Rohnert Park, CA 94928.

E-mail: [lynnc@charmian.sonoma.edu](mailto:lynnc@charmian.sonoma.edu). Phone: 707-664-2655.

**URL:** <http://swift.gsfc.nasa.gov>

**Activities:** "Catching Gamma-Ray Bursts on the Fly" Swift Brochure [A74]  
 "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
 "Exploring the Extreme Universe!" Student Presentations [A262]  
 GLAST High-Energy Informal Education [A17]  
 High-Energy Classroom Teacher Workshops [A172]  
 Newton's First Law of Motion [A113]  
 "Newton's Laws of Gravitation" [A114]  
 Newton's Second Law of Motion [A115]  
 Newton's Third Law of Motion [A116]  
 "Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
 Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
 Swift High-Energy Informal Education [A31]  
 "The Exploding Universe" Public Presentations [A383]  
 The Extreme Universe of Gamma-Ray Astronomy! Public Presentations [A384]  
 "Waves Light Up The Universe!" Teacher Workshops [A229]  
 "Who's Got The Power?" Student Presentations [A303]

## Attached Payloads

### B84. Advanced Cosmic-ray Composition Experiment for the Space Station (ACCESS)

**Description:** ACCESS is under study for a possible launch in 2007. This experiment will make spectral, individual-element composition measurements at energies reaching up to  $10^{15}$  electronvolts in order to address fundamental questions concerning the origin and acceleration of the cosmic radiation.

**URL:** <http://lheawww.gsfc.nasa.gov/ACCESS/>

**Activities:** GLAST High-Energy Informal Education [A17]  
 Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]  
 Swift High-Energy Informal Education [A31]

### B85. Alpha Magnetic Spectrometer (AMS-2)

**Description:** AMS-2 is an experiment to search for antimatter in space. It has flown previously on the Space Shuttle (STS-91, June 1998) and is scheduled for launch to the International Space Station on ISS User Flight 4 (UF-4).

**URL:** [http://ams.cern.ch/AMS/ams\\_homepage.html](http://ams.cern.ch/AMS/ams_homepage.html)

**Activities:** GLAST High-Energy Informal Education [A17]  
 Swift High-Energy Informal Education [A31]

## Other NASA Programs

### B86. High-Energy Astrophysics Science Archive Research Center (HEASARC)

**Description:** Since 1996, the HEASARC education and public outreach (E/PO) program has been bringing information and curriculum-support materials to upper middle school, high school, and lower undergraduate students and their teachers on topics regarding the structure and evolution of the Universe, with emphasis on high-energy astronomy. The E/PO program consists of the "Imagine the Universe!" Web site, a series of posters and information/activity booklets, and a repertoire of educator workshops. Both scientists and educators are involved in the development and testing of the materials which use satellite data to teach topics in science and math. HEASARC also hosts the "StarChild" Web site and annually publishes a CD-ROM containing "Imagine," "StarChild," and the "Astronomy Picture of the Day." Materials are distributed to thousands of educators via



workshops, meetings, and e-mail requests. HEASARC also coordinates with the E/PO programs of other Structure and Evolution of the Universe (SEU) high-energy astrophysics missions such as RXTE, GLAST, Swift, and XMM.

Lead: Dr. James Lochner, NASA Goddard Space Flight Center, Mail Code 662, Greenbelt, MD 20771.  
E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

URL: <http://heasarc.gsfc.nasa.gov>

Activities: "Black Holes in a Different Light" Workshop [A145]  
"Cosmic Connections" Talk [A324]  
Cosmic Journeys Collectible Card Game [A78]  
"Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
Frontiers in Astrophysics Talks [A165]  
GLAST High-Energy Informal Education [A17]  
"Hidden Lives of Galaxies" Workshop [A171]  
"Life Cycles of Stars" Workshop [A178]  
"Light and Shadow" Workshop [A340]  
Overview of the "Imagine the Universe!" CD-ROM [A194]  
Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]  
Science Concepts in Context [A239]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]  
"The Elements" Educator Workshop [A223]  
TIGER on TV [A385]  
TIGER Talk [A298]  
"X-ray Spectroscopy and Chemistry of Supernova Remnants" Field Test [A246]

## International Missions with NASA Participation

### B87. Astro-E2

Description: Astro-E2 is a joint U.S.-Japanese mission to explore the x-ray Universe at high spectral resolution. The mission uses a microcalorimeter which determines x-ray energies from cosmic sources by measuring the heat deposited by the x rays into an absorbing material. To accomplish this, the detector is cooled to 60 millikelvin by using an adiabatic demagnetization refrigerator. The mission also includes lightweight mirrors to focus the x rays onto the detectors. Astro-E2 will probe the chemical composition of supernova remnants and galaxy clusters, and it will measure the motion of material before it falls into a black hole. The education and public outreach (E/PO) program for the mission seeks to bring students into the science and technology of the mission. Working with the NASA Student Involvement Program, Astro-E2 will sponsor a competition for students to share in the data from the mission. This effort will be supported by the Astro-E2 Guest Observer Facility at the NASA Goddard Space Flight Center. We will also produce a video which tells the story of the science, technology, and history of the mission for teachers to use in their science, math, or social studies classes. The video will particularly touch on the cross-cultural aspects of working with the Japanese. These efforts will be supported by a Web site which will provide background material and lessons on the use of spectroscopy in x-ray astronomy.

Lead: Dr. James Lochner, NASA Goddard Space Flight Center, Mail Code 662, Greenbelt, MD 20771.  
E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

URL: [http://astroe.gsfc.nasa.gov/docs/astroe\\_lc/](http://astroe.gsfc.nasa.gov/docs/astroe_lc/)

Activities: Astro-E2: Operating in the Cold [A252]  
GLAST High-Energy Informal Education [A17]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Swift High-Energy Informal Education [A31]

### B88. Herschel Space Observatory (FIRST)

Description: Herschel is cornerstone number 4 (CS4) in the European Space Agency's Horizon 2000 Scientific Program. It will permit high spatial and spectral resolution imaging in the 85-900 micron wavelength region. Superb sensitivity for both photometry and spectroscopy will result from Herschel's high throughput and low thermal background. Herschel will be a multipurpose observatory serving the entire astronomical community. NASA supports U.S. participation on the mission.

URL: <http://sci.esa.int/home/first/index.cfm>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

---

### **B89. International Gamma-Ray Astrophysics Laboratory (INTEGRAL)**

Description: INTEGRAL is an international gamma-ray mission led by the European Space Agency with NASA participation. The Lab for High Energy Astrophysics at the NASA Goddard Space Flight Center provides science support services for the U.S. astronomers who are participating in the mission. INTEGRAL's key science question is to probe the origin of the elements by studying gamma-ray emission lines from the galactic center, supernovas, black holes, and the Sun. The education and public outreach (E/PO) program features the development of a poster and an activity booklet on the topic of the origin of the elements. The development of these materials includes a weeklong educator workshop which provides content for the participants and during which the participants develop classroom activities. The E/PO program also includes the development of a gamma-ray comic book which will explain gamma-ray astronomy and various techniques which are used to detect cosmic gamma rays.

Lead: Dr. James Lochner, NASA Goddard Space Flight Center, Mail Code 662, Greenbelt, MD 20771.  
E-mail: [lochner@xeric.gsfc.nasa.gov](mailto:lochner@xeric.gsfc.nasa.gov). Phone: 301-286-9711.

URL: <http://sci.esa.int/home/integral/index.cfm>

Activities: GLAST High-Energy Informal Education [A17]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Swift High-Energy Informal Education [A31]  
"The Elements" Educator Workshop [A223]

---

### **B90. Planck Surveyor (Planck)**

Description: Planck is the third Medium-Sized Mission (M3) of the European Space Agency's Horizon 2000 Scientific Program. It is designed to image minor variations in the cosmic background radiation over the whole sky, with unprecedented sensitivity and angular resolution. Planck will provide a major source of information relevant to several cosmological and astrophysical issues, such as testing theories of the early Universe and the origin of cosmic structure. NASA supports U.S. participation on the mission.

URL: <http://sci.esa.int/home/planck/index.cfm>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

---

### **B91. Satellite per Astronomia X (BeppoSAX)**

Description: The x-ray astronomy satellite BeppoSAX ("Beppo" in honor of Giuseppe Occhialini) is a project of the Italian Space Agency with participation of the Netherlands Agency for Aerospace Programs. The main scientific characteristic of the BeppoSAX mission is the wide spectral coverage, ranging from 0.1 to over 200 kiloelectronvolts. BeppoSAX has been developed with the support of a consortium of institutes in Italy and in the Netherlands and of the Space Science Department of the European Space Agency. A collaboration with the Max Planck Institute for Extraterrestrial Physics also exists for x-ray mirror testing and the calibration of the concentrator/spectrometer system.

URL: <http://bepposax.gsfc.nasa.gov/bepposax/>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

---

### **B92. Spectrum-X-Gamma (SXG)**

Description: Spectrum-X-Gamma (SXG) is an international high-energy astrophysics observatory which is being built under the leadership of the Russian Space Research Institute.

URL: <http://hea-www.harvard.edu/SXG/sxg.shtml>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

---

### **B93. VLBI Space Observatory Programme (VSOP)**

Description: The VSOP mission is led by the Institute of Space and Astronautical Science in collaboration with the National Astronomical Observatory of Japan. The first VSOP satellite was successfully launched on February 12, 1997, on the new ISAS M-V rocket from the Kagoshima Space Center. The satellite, renamed Highly Advanced Laboratory for Communications and Astronomy (HALCA) after its successful launch, successfully deployed an 8-meter-diameter radio telescope in orbit on February 27-28, 1997. HALCA is in an elliptical Earth orbit, with an

apogee height of 21,000 km and a perigee height of 560 km, which enables VLBI (Very Long Baseline Interferometry) observations on baselines up to three times longer than those achievable on Earth. Observations will be made at 1.6 GHz (18 cm), 5 GHz (6 cm), and 22 GHz (1.3 cm).

URL: <http://www.vsop.isas.ac.jp/>

Activities: GLAST High-Energy Informal Education [A17]  
Swift High-Energy Informal Education [A31]

#### **B94. X-ray Multi-mirror Mission (XMM-Newton)**

Description: XMM-Newton is an x-ray astrophysics observatory developed by the European Space Agency with U.S. participation. This facility-class observatory, with an anticipated lifetime of 10 years, enables astronomers to conduct sensitive x-ray spectroscopic observations of a wide variety of cosmic sources. (XMM-Newton was launched on December 10, 1999.)

URL: <http://sci.esa.int/home/xmm-newton/index.cfm>

Activities: "Cosmic Questions: Our Place in Space and Time" Traveling Exhibition [A5]  
GLAST High-Energy Informal Education [A17]  
High-Energy Classroom Teacher Workshops [A172]  
"Seeing and Exploring the Universe Resource Guide" (2002) [A122]  
Structure and Evolution of the Universe (SEU) Educator Workshops [A216]  
Swift High-Energy Informal Education [A31]

## **SUN-EARTH CONNECTION (SEC) MISSIONS**

### **Major Missions**

#### **B95. Interstellar Probe (IS)**

Description: The Interstellar Probe is a mission in the very early concept definition phase and is designed to cross the solar wind termination shock and heliopause and make a significant penetration into the local interstellar medium, characterizing the regions it passes. This mission offers a significant technological challenge in that its success will require the achievement of spacecraft velocities of 10 astronomical units (10 times the Earth-Sun distance) per year.

URL: <http://interstellar.jpl.nasa.gov/>

Activities: "Live from the Aurora" [A271]

#### **B96. Ulysses**

Description: Ulysses makes passes over the north and south poles of the Sun in order to forecast solar weather. The spacecraft was the first to explore interplanetary science at high solar latitudes. Launched in October of 1990, it has provided scientific data for the last 12 years. Students from Los Angeles County compete for interview opportunities with team members on space science, spacecraft design, spacecraft operations, and project management. Students' interests are matched with team-member volunteers. Students conduct research and professional interviews and do a professional presentation at the end of the project. A team member attends and evaluates all presentations.

URL: <http://www.ulysses.jpl.nasa.gov/index.html>

Activities: From the Outer Planets to the Inner City [A49]  
"Live from the Aurora" [A271]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
Science@NASA [A359]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
Sun-Earth Day [A381]  
Ulysses Tours and Classroom Visits [A301]  
Windows to the Universe [A245]

**B97. Voyager**

- Description:** The Voyager mission, now in its 25th year, continues its quest to push the bounds of space exploration. Voyager 1, now the most distant human-made object in the Universe, and Voyager 2, close on its heels, continue their ground-breaking journeys with their current mission to study the region in space where the Sun's influence ends and the dark recesses of interstellar space begin. Education and public outreach (E/PO) goals include 1) continuing to improve the quality and quantity of project participation in outreach programs; 2) interacting with Deep Space Network Outreach, the Jet Propulsion Laboratory (JPL) Education Office, the Sun-Earth Connection (SEC) community, and the project's investigators to assist in the development of classroom tools; 3) increasing the level of Voyager public awareness with the help of the JPL Media Relations Office; 4) continuing collaborations with the Stanford Solar Center and the SEC Broker/Facilitators; 5) participating in SEC Education Forum Sun-Earth Day teacher training (March 02) and the live Webcast; and 6) attending the National Science Teachers Association meeting as a partner with the SEC Education Forum.
- Lead:** Ms. Andrea Angrum, NASA Jet Propulsion Laboratory, Mail Stop 264-801, 4800 Oak Grove Drive, Pasadena, CA 91109.  
E-mail: [andrea.angrum@mail1.jpl.nasa.gov](mailto:andrea.angrum@mail1.jpl.nasa.gov). Phone: 818-354-6775.
- URL:** <http://voyager.jpl.nasa.gov>
- Activities:** From the Outer Planets to the Inner City [A49]  
"Live from the Aurora" [A271]  
National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
National Convention for the National Science Teachers Association (NSTA) [A348]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
Solar System Ambassadors Program [A363]  
Solar System Ambassadors Training [A364]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
Voyager Classroom Visits [A302]  
Voyager Conferences [A388]  
Voyager Speakers Bureau [A389]  
Voyager Tours [A390]  
Windows to the Universe [A245]

**Explorers****B98. Advanced Composition Explorer (ACE)**

- Description:** The primary purpose of the ACE is to determine and compare the isotopic and elemental composition of several distinct samples of matter, including the solar corona, the interplanetary medium, the local interstellar medium, and galactic matter. For education and public outreach, ACE shares the following topics through a Web site, printed materials, workshops, and presentations: the composition of the Solar System and extrasolar bodies, particle composition from solar wind to galactic cosmic rays, the causes and effects of transient events, solar and galactic evolution, and stellar nucleosynthesis.
- Lead:** Ms. Beth Jacob, NASA Goddard Space Flight Center, Mail Code 661, Greenbelt, MD 20771.  
E-mail: [beth@gamma.gsfc.nasa.gov](mailto:beth@gamma.gsfc.nasa.gov). Phone: 301-286-7209.
- URL:** <http://www.srl.caltech.edu/ACE/ASC/>
- Activities:** A Space Science Module for Los Alamos Space Science Outreach (LASSO) [A138]  
"Live from the Aurora" [A271]  
NASA Connect: Having a Solar Blast [A282]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
"Space Weather Center" Traveling Exhibit [A12]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
Sun-Earth Day [A381]  
Windows to the Universe [A245]

**B99. Aeronomy of Ice in the Mesosphere (AIM)**

**Description:** The scientific purpose of the AIM mission is focused on the study of Polar Mesospheric Clouds (PMCs) that form about 50 miles above Earth's surface in the summer, mostly in the polar regions. The overall goal is to resolve why PMCs form and why they vary. AIM will measure PMCs and the thermal, chemical, and dynamic environment in which they form. This will allow the connection to be made between these clouds and the meteorology of the polar mesosphere. This connection is important because a significant variability in the yearly number of noctilucent ("glow-in-the-dark") clouds (NLCs), one manifestation of PMCs, has been suggested as an indicator of global change. The body of data collected by AIM will provide the basis for a rigorous study of PMCs that can be reliably used to study past PMC changes, present trends, and their relationship to global change. In the end, AIM will provide an expanded basis for the study of long-term variability in Earth's climate. The education and public outreach programs will share the science as new discoveries indicate the connection of the Sun and Earth system.

**Lead:** Ms. Dianne Robinson, Hampton University, Post Office Box 6142, Hampton, VA 23668.

E-mail: [dianne.robinson@hamptonu.edu](mailto:dianne.robinson@hamptonu.edu). Phone: 757-727-5869.

**URL:** <http://www.hamptonu.edu/science/physics/CAS/AIM/aim.html>

**B100. Fast Auroral Snapshot Explorer (FAST)**

**Description:** The FAST Explorer was launched into orbit on August 21, 1996. The instruments aboard FAST measure charged particles which enter Earth's upper atmosphere; large waves of these particles from the Sun begin to glow once inside Earth's atmosphere, causing a spectacular light show known as the aurora borealis or northern lights. The education and public outreach for FAST includes K-12 curriculum components such as lessons, activities, and information that will help teachers and students understand the aurora, the sounding rockets, and the satellites that study them.

**Lead:** Dr. Nahide Craig, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.

E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

**URL:** [http://cse.ssl.berkeley.edu/fast\\_epo/](http://cse.ssl.berkeley.edu/fast_epo/)

**Activities:** "Live from the Aurora" [A271]

"Northern Lights" Planetarium Show [A3]

Science Education Gateway/National Virtual Observatory [A358]

Sun-Earth Day [A381]

Windows to the Universe [A245]

**B101. Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI)**

**Description:** RHESSI is funded by NASA's Explorers Program under the category of small explorers. RHESSI may help to answer one of the most fundamental questions about how the Sun works: How do solar flares release such large quantities of energy in such a short span of time? (A single flare can be as powerful as 10 million volcanic explosions!) The centerpiece of the RHESSI mission is the imager, which uses a new technology to capture images and spectra of high-energy solar flares. RHESSI's primary education and public outreach (E/PO) goal is to provide high-quality education and outreach experiences for precollege teachers, their students, and the general public. Additionally, through our University/NASA Center collaboration, RHESSI will be able to provide research opportunities to enhance the education of undergraduate and graduate students. Thus, the RHESSI education and public outreach effort will permeate all facets of the mission, allowing the college-level students to serve as effective liaisons to the precollege community that we plan to involve. The University of California, Berkeley's E/PO efforts will focus on middle and high school teachers, their students, and the public. In the formal arena, we will concentrate on the middle school grades 6-8, since here is where RHESSI-related content is taught in the precollege science curriculum and where students typically stop being interested in science. We will also conduct regular public awareness activities, highlighting RHESSI data in collaboration with the Exploratorium. The Exploratorium's "Live@the Exploratorium" Internet netcast series will be able to highlight RHESSI during the years of high solar activity through regularly scheduled public events. To complement these high-visibility Internet netcasts for the public, we will develop self-guided Internet modules that highlight key aspects of the RHESSI mission and its data.

**Lead:** Dr. Nahide Craig, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.

E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.

**URL:** <http://cse.ssl.berkeley.edu/hessi>

**Activities:** Heliostat Spectroscopy [A18]

HESSI Book Cover [A96]



"HESSI Spacecraft Model" Booklet [A97]

"Live from the Aurora" [A271]

Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Formal Education Student Support [A289]

Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Outreach to Underserved and Minority Groups [A58]

Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Public Outreach and Informal Education [A355]

Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Shares Sun-Earth Connection Science Through Conferences [A356]

Science Education Gateway/National Virtual Observatory [A358]

Science@NASA [A359]

"Space Weather Center" Traveling Exhibit [A12]

STEREO/IMPACT Formal Education Teacher Inservice Preparation [A213]

Students United with NASA Becoming Enthusiastic About Math and Science (SUNBEAMS) [A218]

Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

Sun-Earth Day [A381]

"Sunspots Lesson Plan Resource Guide" [A126]

### **B102. Imager for Magnetopause-to-Aurora Global Exploration (IMAGE)**

**Description:** The IMAGE satellite is the first spacecraft dedicated to imaging Earth's magnetosphere, a region of space that is controlled by Earth's magnetic field and contains extremely tenuous plasmas of both solar and terrestrial origin. IMAGE employs a variety of imaging techniques to see the invisible and to produce the first comprehensive global images of plasma in the inner magnetosphere. The IMAGE education and public outreach program is called Public Outreach, Education, Teaching and Reaching Youth (or POETRY). We specialize in developing classroom activities, CD-ROMs, and other products that help students understand Earth's magnetic field, its radiation belts, and the impacts of solar activity on our technology. The goal of POETRY is to rewrite the textbooks to explain the causes of auroras, to update K-12 descriptions of Earth's magnetic field and its systems of particles, and to provide teachers with the latest information about the effects of space weather. We also conduct an award-winning "Ask the Space Scientist" Web-based resource, where students may ask questions about space science.

**Lead:** Dr. Sten Odenwald, NASA Goddard Space Flight Center, Mail Code 630, Greenbelt, MD 20771.

E-mail: [odenwald@mail630.gsfc.nasa.gov](mailto:odenwald@mail630.gsfc.nasa.gov). Phone: 301-286-6953.

**URL:** <http://image.gsfc.nasa.gov/poetry>

**Activities:** A Space Science Module for Los Alamos Space Science Outreach (LASSO) [A138]

"Exploring the Earth's Magnetic Field"—An IMAGE Satellite Guide [A86]

IMAGE Amateur Astronomy Clubs [A337]

IMAGE Internet Activities [A100]

IMAGE Planetariums and Museum Lectures [A338]

IMAGE Presentations to Students [A269]

IMAGE Teacher Workshops and Training [A173]

"Live from the Aurora" [A271]

"Northern Lights" Planetarium Show [A3]

Passport to the Solar System [A236]

"Polly's and Ernie's Adventures in Space" [A121]

Science Concepts in Context [A239]

"Space Weather Center" Traveling Exhibit [A12]

Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]

Sun-Earth Day [A381]

Two Wide-angle Imaging Neutral Atom Spectrometers (TWINS) Teacher Training Program [A228]

### **B103. Interplanetary Monitoring Platform (IMP-8)**

**Description:** IMP-8 (also known as IMP-J) was launched by NASA in 1973 to measure the magnetic fields, plasmas, and energetic charged particles (e.g., cosmic rays) of Earth's magnetotail and magnetosheath and of the near-Earth solar wind. IMP-8, the last of 10 IMP (Interplanetary Monitoring Platform) spacecraft launched in 10 years, continues to accumulate data that is useful in understanding long-term solar processes. IMP-8 scientists at NASA Goddard Space Flight Center provide their expertise through the validation of educational

products whose content deals with interplanetary and magnetotail studies of cosmic rays, energetic solar particles, plasma, and electric and magnetic fields.

Lead: Mr. Joseph King, NASA Goddard Space Flight Center, Mail Code 633, Greenbelt, MD 20771.

E-mail: [Joseph.H.King.1@gsfc.nasa.gov](mailto:Joseph.H.King.1@gsfc.nasa.gov). Phone: 301-286-7355.

URL: <http://nssdc.gsfc.nasa.gov/nmc/tmp/1973-078A.html>

Activities: "Live from the Aurora" [A271]

#### **B104. Solar Anomalous and Magnetospheric Particle Explorer (SAMPEX)**

Description: SAMPEX is designed to detect solar energy particles, precipitating energetic electrons, anomalous cosmic rays, and galactic cosmic rays throughout a solar cycle. Education and public outreach consist of SAMPEX scientists and engineers at NASA Goddard Space Flight Center who support a high school team in the Cooperative Satellite Learning Program (CSLP). The CSLP is a unique education partnership among various high schools, Allied Signal Technical Services Corporation in Seabrook, MD, and Goddard Space Flight Center that involves high school students in the process of developing and operating SAMPEX. This pilot program provides students with an understanding of the overall end-to-end system that is used to support SAMPEX, and it will demonstrate how NASA implements a specific mission for a given scientific endeavor. It also introduces the students to careers in space. A mission monitoring system in the high school receives and processes SAMPEX satellite data and provides computer-assisted tutoring. In this way, students participate directly in SAMPEX tests, simulations, and orbital operations.

Lead: Dr. Jim Watzin, NASA Goddard Space Flight Center, Mail Code 474, Greenbelt, MD 20771.

E-mail: [jim.watzin@gsfc.nasa.gov](mailto:jim.watzin@gsfc.nasa.gov). Phone: 301-286-7933.

URL: <http://sunland.gsfc.nasa.gov/smex/sampex/index.html>

#### **B105. Student Nitric Oxide Explorer (SNOE)**

Description: SNOE is a small scientific satellite that is measuring the effects of energy from the Sun and the magnetosphere on the density of nitric oxide in Earth's upper atmosphere. It is one of the three projects selected for the Student Explorer Demonstration Initiative Program (STEDI) to demonstrate that university-led teams can successfully carry out high-quality space science and technology missions. Students are involved in all aspects of the project. Under the supervision of the Laboratory for Atmospheric and Space Physics (LASP) of the University of Colorado (UC) and industry mentors, they worked on the design study, built the spacecraft and instruments, wrote the flight software, integrated and tested the instruments and subsystems, and integrated the satellite with the launch vehicle. SNOE will be operated from the LASP Space Technology Research building by a team of students and mission operations professionals. Advanced undergraduate and graduate students will analyze the data. The student training effort was coordinated through a course offered continuously in the UC Department of Aerospace Engineering Sciences.

Lead: Mr. Kenneth Mankoff, University of Colorado at Boulder, Boulder, CO 80309.

E-mail: [mankoff@lasp.colorado.edu](mailto:mankoff@lasp.colorado.edu). Phone: 303-492-2326.

URL: <http://lasp.colorado.edu/snoe/>

#### **B106. Transition Region and Coronal Explorer (TRACE)**

Description: A mission of the Small Explorer program, TRACE observes the effects of the emergence of magnetic flux from deep inside the Sun to the outer corona with high spatial and temporal resolution. (TRACE was launched on April 1, 1998.)

Lead: Mr. Neal Hurlburt, Lockheed Martin Solar and Astrophysics Laboratory, 3251 Hanover Street, Palo Alto, CA 94304.

E-mail: [hurlburt@lmsal.com](mailto:hurlburt@lmsal.com). Phone: 650-354-5504.

URL: <http://vestige.lmsal.com/TRACE/>

Activities: National Conference for the International Technology Education Association [A188]

National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]

Sun-Earth Day [A381]

Sun-Earth Scale Model Brochure [A125]

#### **B107. Two Wide-angle Imaging Neutral-atom Spectrometers (TWINS)**

Description: The TWINS mission provides a new capability for stereoscopically imaging the magnetosphere. In contrast to traditional space experiments which make measurements at only one point in space, imaging experiments provide simultaneous viewing of different regions of the magnetosphere. Stereo imaging, as done by TWINS, takes the next step of producing 3-D images and will provide a leap ahead in our understanding of the global

aspects of the terrestrial magnetosphere. The TWINS education and public outreach program is carried out through the Los Alamos Space Science Outreach (LASSO) program, an umbrella program for space science education activities at Los Alamos National Lab (LANL). It is based on teacher workshops in which K-14 teachers spend several weeks at LANL learning space science from lab scientists and developing methods and materials for teaching this science to their students. The program supports an instructional model that is based on education research and cognitive theory. Students and teachers engage in activities that encourage critical thinking and a constructivist approach to learning.

Lead: Dr. Ruth Skoug, Los Alamos National Laboratory, NIS-1, Mail Stop D466, Los Alamos, NM 87545.

E-mail: [rskoug@lanl.gov](mailto:rskoug@lanl.gov). Phone: 505-667-6594.

URL: <http://nis-www.lanl.gov/nis-projects/twins/>

Activities: A Space Science Module for Los Alamos Space Science Outreach (LASSO) [A138]  
Two Wide-angle Imaging Neutral Atom Spectrometers (TWINS) Teacher Training Program [A228]

## International Solar-Terrestrial Physics

### B108. International Solar-Terrestrial Physics Program Office (ISTP)

Description: The ISTP program is a comprehensive effort to observe and understand our star and its effect on our environment. The education and public outreach effort focuses on sharing those discoveries in the formal and informal education communities through mentoring, exhibits, and workshops.

Activities: "Live from the Aurora" [A271]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
"Space Weather Center" Traveling Exhibit [A12]

### B109. Cluster II

Description: Cluster is a European Space Agency program with major NASA involvement. The four Cluster spacecraft carry out 3-D measurements in Earth's magnetosphere, covering both large- and small-scale phenomena in the sunward and tail regions. The first two spacecraft were launched on July 16, 2000; the second pair were launched on August 9, 2000.

URL: <http://sci.esa.int/home/clusterii/index.cfm>

Activities: "Live from the Aurora" [A271]  
Sun-Earth Day [A381]

### B110. Geotail

Description: The Geotail mission is a collaborative project undertaken by the Japanese Institute of Space and Astronautical Science (ISAS) and NASA. Its primary objective is to study the tail of Earth's magnetosphere. The information gathered is allowing scientists to model and more accurately predict Sun-Earth interactions and their effects on space exploration, communications, and technology systems. (Geotail was launched on July 24, 1992.)

URL: <http://www-spof.gsfc.nasa.gov/istp/geotail/>

Activities: "Live from the Aurora" [A271]

### B111. Polar

Description: The Solar-Terrestrial Science Program (STSP), composed of SOHO and Cluster with Geotail (ISAS-Japan), Wind, and Polar, cooperates in education and public outreach by providing educational products, science data, and images that tell the story of the Sun. These materials (images) can be seen in most museums, planetariums, and science centers, and they support STSP's work with the general public. Images are also shown by national television broadcasting companies to share a solar event with the public when it happens.

Lead: Dr. Nicola Fox, NASA Goddard Space Flight Center, Mail Code 600, Greenbelt, MD 20771.

E-mail: [nicola.fox@gsfc.nasa.gov](mailto:nicola.fox@gsfc.nasa.gov). Phone: 301-286-8872.

URL: <http://www-spof.gsfc.nasa.gov/istp/polar/>

Activities: Aurora Poster [A69]  
"Live from the Aurora" [A271]  
Passport to the Solar System [A236]  
Science Concepts in Context [A239]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

**B112. Solar and Heliospheric Observatory (SOHO)**

**Description:** SOHO is designed to study the internal structure of the Sun, its extensive outer atmosphere, and the origin of the solar wind—the stream of highly ionized gas that blows continuously outward through the Solar System. SOHO is helping us to better understand the interactions between the Sun and Earth's environment than has been possible to date. Its legacy may enable scientists to solve some of the most perplexing riddles about the Sun, including the heating of the solar corona, the acceleration of the solar wind, and the physical conditions of the solar interior. It will give solar physicists their first long-term, uninterrupted view of the mysterious star that we call the Sun. The SOHO education and public outreach program generates and distributes educational and outreach materials on the Sun and SOHO for use in schools and by the public. The materials include posters, CDs, image sets, slide sets, stickers, and videos. Scientists give presentations in classrooms, at teacher workshops, in museums, and to other scientists. Materials are also provided to publications and news organizations.

**Lead:** Dr. Steele Hill, NASA Goddard Space Flight Center, Mail Code 682.3, Greenbelt, MD 20771.

E-mail: [steele.hill@gsfc.nasa.gov](mailto:steele.hill@gsfc.nasa.gov). Phone: 301-286-6452.

**URL:** <http://soho.nascom.nasa.gov/>

**Activities:** Heliosat Spectroscopy [A18]

Lesson Plan Development: Convection, Spectroscopy, and Velocity and Acceleration [A234]

"Live from the Aurora" [A271]

National Conference for the International Technology Education Association [A188]

National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]

National Convention for the National Science Teachers Association (NSTA) [A348]

Partnerships in Astronomy and Astrophysics Education and Research at Southern University [A41]

Passport to the Solar System [A236]

Science Concepts in Context [A239]

"Space Weather Center" Traveling Exhibit [A12]

Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]

Sun-Earth Day [A381]

**B113. Wind**

**Description:** The Solar Terrestrial Science Program (STSP) composed of SOHO and Cluster, with Geotail (ISAS-Japan), Wind, and Polar, cooperates in education and public outreach by providing educational products, science data, and images that tell the story of the Sun. These materials (images) can be seen in most museums, planetariums, and science centers, and they support STSP's work with the general public. Images are also shown by national television broadcasting companies to share a solar event with the public when it happens.

**Lead:** Dr. Nicola Fox, NASA Goddard Space Flight Center, Mail Code 600, Greenbelt, MD 20771.

E-mail: [nicola.fox@gsfc.nasa.gov](mailto:nicola.fox@gsfc.nasa.gov). Phone: 301-286-8872.

**URL:** <http://www-istp.gsfc.nasa.gov/istp/wind/wind.html>

**Activities:** "Live from the Aurora" [A271]

Passport to the Solar System [A236]

Science Concepts in Context [A239]

Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]

## Solar-Terrestrial Probes

**B114. Solar-Terrestrial Probes Program Office (STP)**

**Description:** NASA's STP program represents a significant opportunity for ground-breaking education and public outreach (E/PO) in the fields of solar science, information technology, engineering studies, and the Solar System. The STP program office initiates programs that adhere to E/PO guidelines as set forth by the Office of Space Science. This includes E/PO efforts for formal and informal education, public outreach, and public and media relations. The program promotes excellence in science, mathematics, engineering, and technology education through its direct involvement in partnerships, workshops, and internships. Most programs lend themselves to nationwide participation, with a special emphasis on serving groups that have been historically underrepresented in the space sciences.

Lead: Ms. Barbara Lambert, NASA Goddard Space Flight Center, Mail Code 460, Greenbelt, MD 20771.  
E-mail: [Barbara.J.Lambert.1@gsfc.nasa.gov](mailto:Barbara.J.Lambert.1@gsfc.nasa.gov). Phone: 301-286-1275.

URL: <http://stp.gsfc.nasa.gov>

Activities: Living With a Star (LWS) Master Teacher Leadership and Mentor Program [A183]  
Living With a Star (LWS) Preservice Workshop [A184]  
Our Star the Sun—Living With a Star (LWS) Summer Institute [A193]  
Solar-Terrestrial Probes (STP) Educational Programs and Workshops [A208]  
Solar-Terrestrial Probes (STP) Outreach [A365]  
Solar-Terrestrial Probes (STP) Student Competitions [A290]  
Student Interns Gain Professional Experience on the Solar-Terrestrial Probes (STP) Program [A296]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
Sun-Earth Day [A381]  
Teacher Interns Explore Solar-Terrestrial Probes (STP) [A222]

---

### **B115. Magnetospheric Multiscale (MMS)**

Description: Broad regions of Earth's magnetosphere are connected by fundamental processes operating in the thin boundary layers. Processes of vastly different scale sizes can interact strongly. Understanding these fundamental processes requires multipoint measurements that uniquely separate temporal and 3-D spatial variations. The MMS mission goal is to make those necessary measurements with a five-spacecraft constellation in highly elliptical orbits. MMS is a future Solar-Terrestrial Probes mission.

URL: <http://stp.gsfc.nasa.gov/missions/mms/mms.htm>

Activities: "Live from the Aurora" [A271]

---

### **B116. Solar-B**

Description: The Solar-B satellite observatory will be launched into a polar orbit around Earth to allow almost uninterrupted observations of our Sun. Three major instruments will make coordinated observations at multiple wavelengths, examining the processes taking place on the Sun's surface and in its atmospheric envelope. Solar-B education and public outreach will be developed and implemented primarily at the new Chabot Space and Science Center in Oakland, CA, in collaboration with the Lockheed Martin Solar and Astrophysics Laboratory. The forms of education and outreach include exhibits, teacher training workshops, video/multimedia productions, posters and brochures, an adult solar astronomy class, "solar" summer camps for children, and a high school solar astronomy internship program.

Lead: Mr. Benjamin Burrell, Chabot Space and Science Center, 10902 Skyline Blvd., Oakland, CA 94619.  
E-mail: [bburrell@chabotspace.org](mailto:bburrell@chabotspace.org). Phone: 510-336-7308.

URL: <http://www.chabotspace.org/vsc/exhibits/solarb/default.asp>

Activities: Fun in the Sun—Summer Camp [A331]  
Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Public Outreach and Informal Education [A355]  
Solar Eclipse Watch [A362]  
Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
Sunspotting—Tracking the Wild Sunspot [A382]  
"Touch the Sun" [A131]  
"Touch the Sun" Teacher Workshop [A227]

---

### **B117. Solar-Terrestrial Relations Observatory (STEREO)**

Description: STEREO is the third of five Solar-Terrestrial Probes, and it will obtain simultaneous images of the Sun from two spacecraft and build a 3-D picture of coronal mass ejections (CMEs) and the complex structures around them. STEREO will also study the propagation of disturbances through the heliosphere and their effects at Earth orbit. The STEREO education and public outreach program participates in the Sun-Earth Connection Education Forum, sponsored workshops that meet the needs of educators at all grade levels. We present these workshops to inservice educators to teach them about the most recent and relevant solar and STEREO science discoveries, which they will then teach in their classrooms. Mission scientists participate in the workshops to share the science content. Education specialists provide integrated, hands-on activities to demonstrate science application in the classroom. The missions also provide images and animations to support programs that have been developed by the science centers, specifically for educators and for the general public.

Lead: Dr. Nahide Craig, University of California, Berkeley, Mail Code 7450, Berkeley, CA 94720.



E-mail: [ncraig@ssl.berkeley.edu](mailto:ncraig@ssl.berkeley.edu). Phone: 510-643-7273.  
 URL: <http://stp.gsfc.nasa.gov/missions/stereo/stereo.htm>  
 Activities: "Live from the Aurora" [A271]  
 Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Formal Education Student Support [A289]  
 Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Public Outreach and Informal Education [A355]  
 Science Education Gateway/National Virtual Observatory [A358]  
 STEREO/IMPACT Formal Education Teacher Inservice Preparation [A213]  
 STEREO/PLASTIC Interactive Workshops [A214]  
 Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
 Sun-Earth Day [A381]

### **B118. Thermosphere Ionosphere Mesosphere Energetics and Dynamics (TIMED)**

Description: The TIMED mission will study the influences of the Sun and humans on the least explored and understood region of Earth's atmosphere, the Mesosphere and Lower Thermosphere/Ionosphere (MLTI). The MLTI region is a gateway between Earth's environment and space, where the Sun's energy is first deposited into Earth's environment. TIMED will focus on a portion of this region located approximately 60-180 kilometers above the surface. From studying portions of Earth's atmosphere, scientists believe global change is occurring primarily due to variations in the Sun's cycle and to the human-induced release of gases such as methane and carbon dioxide into this atmosphere. The TIMED education and public outreach Web site offers activities, a Teacher's Corner, and TIMED lesson plans.

Lead: Ms. Kerri Beisser, Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723-6099.

E-mail: [kerri.beisser@jhuapl.edu](mailto:kerri.beisser@jhuapl.edu). Phone: 443-778-6050.

URL: <http://www.timed.jhuapl.edu/>

Activities: "Live from the Aurora" [A271]  
 Near-Earth Asteroid Rendezvous (NEAR) Classroom Visits and Student Events [A284]  
 Near-Earth Asteroid Rendezvous (NEAR) Museum and Conference Exhibits and Support [A26]  
 Near-Earth Asteroid Rendezvous (NEAR) Special Interest Groups [A350]  
 Near-Earth Asteroid Rendezvous (NEAR) Student Events/Support [A285]  
 Near-Earth Asteroid Rendezvous (NEAR) Teacher Support [A190]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Solar-Terrestrial Probes (STP) Student Competitions [A290]  
 Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
 Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
 Sun-Earth Day [A381]  
 TIMED Classroom Visits and Student Events [A299]  
 TIMED Public Outreach [A386]  
 TIMED Spacecraft Mobile [A129]  
 TIMED Spacecraft Model [A130]  
 TIMED Student Events [A300]  
 TIMED Teacher Support [A226]

## **Other NASA Programs**

### **B119. Living With a Star (LWS)**

Description: Living With a Star (LWS) is a NASA initiative that addresses aspects of the Sun-Earth system that affect life and society. This program is a part of the Sun-Earth Connection (SEC) theme within the Office of Space Science. The program elements are 1) a space weather research network, 2) theory, modeling, and data analysis programs, 3) space environment testbeds, and 4) established and expanded partnerships. The goals and objectives link to each of the six NASA Strategic Enterprises: Space Science, Earth Science, Human Exploration and Development of Space, Aerospace Technology, Biological and Physical Research, and Education.

Lead: Dr. Evelina Felicite-Maurice, NASA Goddard Space Flight Center, Mail Code 460, Greenbelt, MD 20771.

E-mail: [efelicit@pop400.gsfc.nasa.gov](mailto:efelicit@pop400.gsfc.nasa.gov). Phone: 301-286-6949.

URL: <http://lws.gsfc.nasa.gov>

Activities: "Live from the Aurora" [A271]  
 Living With a Star (LWS) Follow-Up Program and School Visits [A180]  
 Living With a Star (LWS) Information Technology Program [A181]  
 Living With a Star (LWS) Inservice Teacher Workshop [A182]  
 Living With a Star (LWS) Master Teacher Leadership and Mentor Program [A183]  
 Living With a Star (LWS) Preservice Workshop [A184]  
 Living With a Star (LWS) Student Internship [A272]  
 Living With a Star (LWS) Summer Teacher Internship [A185]  
 Our Star the Sun—Living With a Star (LWS) Summer Institute [A193]  
 Passport to the Solar System [A236]  
 Science Concepts in Context [A239]  
 Sun-Earth Connection Education Forum (SECEF) Conference Programs [A219]  
 Sun-Earth Connection Education Forum (SECEF) Professional Development: Sharing Sun-Earth Connections with Inservice Teachers [A221]  
 Sun-Earth Day Information for Tribal Schools [A60]

### **B120. Space Technology-5 [New Millennium] (ST-5)**

Description: "The Space Place" has involved ST-5 in the following events/activities: We attend conferences to promote "The Space Place" and all of the projects involved with the Web site. Usually, mission- or Space Place-related items are passed out. Libraries, science museums, planetariums, zoos, and aquariums in the United States have formed Club Space Place partnerships with NASA. They get Space Place-provided display materials, an activity guide, and handouts for an original group activity. Through these partnerships, we promote "The Space Place" Web site and NASA Jet Propulsion Laboratory missions. Club Space Place provides quarterly, interdisciplinary, hands-on activities that are related to space or Earth science. These quarterly activities go to Space Place library and museum partners, Boys & Girls Clubs of America, the YWCA, and the Civil Air Patrol. Presently there are 272 partners reaching thousands of children. On a monthly basis, Space Place provides articles for over 20 newspapers nationwide in English and Spanish. The combined readership for that one day a month adds up to more than 2.5 million. The articles always end with information on activities, a link to "The Space Place" Web site, and links to mission Web sites. Diane Fisher submits articles to "Technology and Children" magazine four times a year and articles to "The Technology Teacher" magazine eight times a year. Each article, published under a Space Place header, refers to a particular mission. Each "Technology and Children" publication reaches an estimated 1,400 teachers and their students (up to 42,000 children), and each "The Technology Teacher" publication reaches an estimated 8,000 teachers and their students (up to 224,000 children). Articles are also posted on ITEA's Web site which reaches an even wider audience. "The Space Place" Web site is a dynamic site that offers interactive experiences and fun facts for children and adults. "The Space Place" is supported by the New Millennium Program. It reaches an average of 3,000 viewers a day.

Lead: Ms. Nancy Leon, NASA Jet Propulsion Laboratory, Mail Stop 171-350, 4800 Oak Grove Drive, Pasadena, CA 91109.

E-mail: [Nancy.J.Leon@jpl.nasa.gov](mailto:Nancy.J.Leon@jpl.nasa.gov). Phone: 818-354-1067.

URL: <http://spaceplace.nasa.gov>

Activities: Club Space Place Activities [A322]  
 "Design a Tortilla Spacecraft!" [A82]  
 From the Outer Planets to the Inner City [A49]  
 National Conference for the International Technology Education Association [A188]  
 National Conference for the National Council of Teachers of Mathematics (NCTM) [A347]  
 Space Place Contributions to ITEA's "Technology and Children" [A368]  
 Space Place Contributions to ITEA's "The Technology Teacher" [A369]  
 Space Place Museum and Library Partnerships [A370]  
 Space Place Newspaper Contributions [A371]

## **International Missions with NASA Participation**

### **B121. Yohkoh**

Description: Yohkoh, an observatory for studying x rays and gamma rays from the Sun, is a project of the Institute for Space and Astronautical Sciences, Japan. The spacecraft was built in Japan, but the observing instruments had contributions from the United States and from Great Britain. Yohkoh was launched on August 30, 1991;

the spacecraft lost attitude control in December 2001, and recovery attempts have been unsuccessful.

URL: <http://www.lmsal.com/SXT/>

Activities: "Live from the Aurora" [A271]

Passport to the Solar System [A236]

Science Concepts in Context [A239]

Sun-Earth Day [A381]

The Dynamic Sun Planetarium Project [A4]

